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SHOULD COST: GUIDELINES FOR THE SELECTION OF TEAM
MEMBERS

ARMY PROCUREMENT RESEARCH OFFICE

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SHOULD COST: GUIDELINES FOR THE SELECTION OF TEAM MEMBERS

PRO PROJECT 71-3

June 1973

Keith A. Ulrich

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ABSTRACT

The Should Cost analysis technique of contract pricing, because of its integrated-skills approach to accomplish detailed cost analyses, requires the talents of highly qualified personnel in order to be cost-effective.

This study reviews the personnel selection techniques commonly employed in business, and the personal characteristics normally considered in personnel selection. Observations are made regarding the applicability of these techniques and personal characteristics in selecting personnel for Army Materiel Command (AMC) Should Cost teams. The selection methods used to staff Should Cost teams in the past are then evaluated.

The study concludes by offering guidelines for improving the process of identifying and selecting highly qualified personnel to perform Should Cost analyses.

SUMMARY

A. Background: The Army Materiel Command (AMC) has seen fit to employ the Should Cost analysis technique on eighteen major procurements in the last two and one-half years and plans to continue emphasizing its application. It is obvious that this technique is expensive in terms of both cost and the talent required; consequently, it should be applied only where cost-effectiveness considerations justify its use.

It is necessary that personnel performing the analysis be capable of developing a highly defensible position on which to base the Government's negotiation objective. A second rate analysis will fail in the real test - the contract negotiation. Therefore, the nature of a Should Cost analysis requires that the personnel selected be highly competent, motivated and inquisitive. Anything less will be a waste of resources and will incur less-than-first-class results. Recognizing this, AMC has stated that the objective of Should Cost analysis is to utilize the most highly motivated and best available talent within AMC on a team basis to develop realistic negotiation objectives based on an in-depth, multi-disciplined analysis of the contractor's cost proposal.

B. Objective: To develop guidance for Should Cost team leaders in identifying and selecting the best available talent for participation on Should Cost teams.

C. Scope and Methods: Normally, the Should Cost team will have, as a minimum, a team chief, an administrative officer, three sub-team chiefs

and several functional specialists. Included in the last category will be engineers, primarily those with an industrial engineering background, price analysts, auditors, contract specialists, and management analysts. Both civilian and military personnel participate on Should Cost teams.

In undertaking this study, the initial intent was to provide specific guidance in terms of traits, characteristics and performance ratings that might make the selection of these persons virtually automatic. However, there is no perfect mechanical solution to the selection process. In a Should Cost team, like in any other business oriented venture requiring the cooperation and coordination of personnel with varied skills and backgrounds, staffing remains a major function of the management process, as important as the planning, organizing, directing and controlling phases.

Four sources of data were utilized as the basis for this research study:

1. Literature on personnel selection procedures and techniques.
2. Career appraisals and biographical data for persons who served on the first eleven AMC Should Cost teams.
3. Should Cost team chiefs' appraisals of team members' performance.
4. Interviews with individuals involved in the selection of personnel for previous Should Cost teams.

D. Observations:

1. General. Any attempt to select personnel for a specific assignment in an orderly, rational manner must be preceded by a defining of the position. We cannot place someone in a job that will be suitable for his talent

unless we first know the requirements of the job. On the other hand, to establish too rigid a set of qualifications, which few applicants will ever match, will result in a "dream sheet."

The ineffectiveness of a selection process can often be attributed to reliance on information which is not an accurate indication of job performance. In conjunction with this, there is the problem of "selective perception," the natural human characteristic which tends to place too much emphasis on first impressions; this is often caused by a bias on the part of the selector.

The objective of formal personnel selection procedures is to permit the evaluation of candidates based on their resemblance to "currently successful" employees, in terms of characteristics which research has shown to be related to success in the organization. Techniques used to evaluate these distinguishing characteristics must possess both validity and reliability. The applicability of these techniques is contingent upon the ability to differentiate between the "relatively successful" and the "relatively unsuccessful" employees currently on board.

2. Selection Devices. Among the selection devices reviewed were the weighted application blank, psychological tests, references, and the interview:

a. The weighted application blank is essentially the quantifying and weighting of personal history information from an application blank or resume to provide a predictive score of the applicant's success in a job. A carefully developed typical behavior inventory can often be the best individual predictor of future job behavior; its relative success compared to other selection devices is attributable to the fact that one of the best predictors of future behavior is past behavior.

b. The use of psychological tests has provoked all sorts of arguments regarding their merits and drawbacks. A major problem with using tests is that one often relies on the test results to the exclusion of all other selection devices, thereby relinquishing his managerial decision-making process for the convenience of an automatic scoring device. Personality tests are generally regarded as suitable for vocational counseling purposes, but not for employment purposes. Experts generally agree that most tests should be used only as a last resort, although an exception is skill tests.

c. The value of personal references, that is, those supplied by the applicant, is generally questionable.

d. The interview, while the mainstay of the selection process, draws the wrath and anger of many experts in the fields of industrial psychology and personnel research, because the little research that there has been to date casts doubt on the validity of the interview as a selection device. In the best selection programs, the interview will be only one of a number of selection methods used. Structured interviews tend to have greater reliability than unstructured (informal) ones; combining the evaluations of several interviewers on a single applicant may serve to reduce the bias of any one interviewer; allowing knowledgeable journey-men to serve as interviewers may result in a better evaluation of technical skills and knowledge; and interviewing several applicants for the same position, on a group basis, may provide valuable insight into their leadership traits and problem-solving abilities.

3. Personal Characteristics. Literature on the "characteristics of successful individuals" was reviewed with the conclusion that much of

it is useless, being highly opinionated and unvalidated. Rather, emphasis should be placed on demonstrated performance and the possession of technical, human and conceptual skills. Particular characteristics that were considered include performance appraisals, education, experience, and age.

a. Many times, performance appraisals represent opinions on behavioral qualities that have never been proven necessary for good performance. The definition of success is such a loose concept that supervisors who rate people as to their success are in fact rating many different things. Studies on the validity and reliability of performance appraisals have shown that there are numerous errors which can creep into the system. There is the leniency error, the awarding of a higher evaluation in one or more traits than the employee actually deserved; the central tendency problem where raters evaluate their employees consistently as average; the "halo effect," which is the influence that a rater's general impressions of an individual has upon the ratings of that individual on specific traits; and the major problem of varying standards between raters.

b. Specifying a minimum level of education, such as a college degree, is often done because it appears to be indicative of the "ability to think." It is generally concluded that the strict adherence to a minimum educational level will not serve as an effective means of identifying the best workers. In fact, it may tend to exclude a large number of individuals who have achieved high degrees of competence in their

specific fields through many years of experience. In technical fields, though, a college degree in the same or related field does serve notice that one possesses formal technical knowledge relevant to his specific field of endeavor. An individual who has become proficient in a technical speciality through many years of practical experience would normally not be considered an engineer in the broad sense of the word, unless he possesses technical knowledge as might reasonably be expected of a graduate engineer.

c. When training and experience are evaluated solely on the basis of a few statements in a resume or employment form, it completely omits the qualitative aspects of the evaluation. Placing minimum requirements on experience either by specifying a certain number of years in industrial experience or by specifying a certain number of years at a certain grade level may have an adverse effect of tossing aside the enthusiastic and educated younger employee who can perform admirably. If one is too particular in specifying experience requirements by emphasizing the quantity aspects, e.g., x years of experience, and not the qualitative aspects, the selection situation may be loaded to produce no better than the best of a poor lot.

4. Scarce Resources. Industrial engineers and price analysts, the two most commonly desired functional specialists on Should Cost teams, are scarce commodities. For example, there are only 183 price analysts, at all grade levels, at the seven AMC commodity commands. There are 352 persons classified as industrial engineers, GS-12 and above, and they are distributed unevenly among the commodity commands; two commands

account for over 75 percent of the industrial engineers, while two other commands have less than five each.

5. Experiences of Team Chiefs. Information obtained in interviews with team leaders (i.e., team chiefs, deputy team chiefs, operations officers) of the first eleven AMC Should Cost teams, regarding the methods used to select team members, and their opinions as to the adequacy of these methods, revealed the following:

a. The selection processes employed to date for staffing AMC Should Cost teams have, for the most part, been characterized by a lack of planning and order. Lack of time has been a major constraint; there are few indications of team leaders having spent considerable time in reviewing the qualifications of several individuals and then selecting those who appeared to be best qualified.

b. There did not appear to be any instances where the team leader has actually defined the qualifications beforehand and applied any sort of merit rating or quantitative approach in selecting team members. The best that can be said is that qualifications were only considered in a qualitative manner.*

*An APRO study, The Should Cost Team: Size and Composition, conducted in February 1971, noted that the size and mix of a team must be tailored to the magnitude and complexity of the problem. It concluded that the "advance team" best allows this condition to be met. The underlying concept is that an advance or "scout" team, consisting of the team chief, deputy team chief, operations officer, and sub-team chiefs, having physically reviewed the contractor's operation and met with contractor personnel and cognizant Government contract administration personnel, will be able to logically identify areas for investigation that offer the most payoff potential, develop a study plan including milestones, and establish resource requirements, i.e., team size and skill mix.

6. Conclusions:

a. In attempting to relate the biographical data of individuals who have served on Should Cost teams to their performances, it was found that both the employee's annual career appraisal and the team chiefs' evaluations appear influenced by the "leniency error," i.e., the awarding of a higher evaluation in one or more traits than the employee actually deserves. Consequently, the data base is considered very suspect. Since the ability to classify individuals as "relatively successful" and "relatively unsuccessful" is a prerequisite to establishing an effective personnel selection process, the lack of valid career appraisals is a serious handicap. One observation resulting from the data analysis is that individuals with one or more "2's," or lower scores, in their last annual career appraisal should not be considered for a Should Cost team.

b. The value of holding a training session, such as the Should Cost Workshop, immediately prior to the in-plant analysis, deserves considerable consideration since it possesses some of the qualities of a skills test while at the same time serves as a means of observing the performance of prospective team members in a form of situational test.

c. While the main objective of the report is to develop guidance for the identification and selection of personnel to perform Should Cost analyses, two areas have been noted which require attention to facilitate the selection process: one is the establishment of a roster of "top-performers" within AMC to serve on special projects such as Should Cost, the other is a conscious effort to uphold the image of Should Cost.

Guidance for the identification and selection of personnel to perform Should Cost analyses, based on the findings of this study, is presented in Chapter V, Part C. This section has also been published as a separate report and has been written in a manner to facilitate its incorporation into the next revision of AMC Pamphlet 715-7, "Should Cost Analysis Guide."

CHAPTER I

INTRODUCTION

A. Background

The Army Materiel Command (AMC) has seen fit to employ the Should Cost analysis technique on eighteen major procurements in the last two and one-half years and plans to continue emphasizing its application. This technique is expensive in terms of both cost and the talent required; consequently, it should be applied only where cost-effectiveness considerations justify its use. In the past, Should Cost teams have required the talents of ten to thirty professional personnel, ranging from GS-11 through GS-15 and Lieutenant through Colonel. The in-plant analysis normally lasts from four to six weeks. Including the time expended in the planning phase prior to entering the plant, the report writing phase subsequent to the in-plant analysis and the resultant negotiation, many members of the team, especially those having leadership roles, may spend up to six months on an individual study.

It is necessary that personnel performing the analysis be capable of developing a highly defensible position on which to base the Government's negotiation objective. A second rate analysis will fail in the real test - the contract negotiation. Therefore, the nature of a Should Cost analysis requires that the personnel selected be highly competent, motivated and inquisitive. Anything less will be a waste of resources and will incur less-than-first-class results. Recognizing this, AMC has stated that the objective of Should Cost analysis is to utilize the most highly motivated and best available talent within AMC on a team basis to develop

realistic negotiation objectives based on an in-depth, multi-disciplined analysis of the contractor's cost proposal.

B. Purpose

To develop guidance for Should Cost team leaders in identifying and selecting the best available talent for participation on Should Cost teams.

C. Scope and Methods

Figure 1 depicts the common organization of a Should Cost team. Depending upon the particular aspects of the contractor being studied and the size of the proposal under analysis, there may be some variations.

Normally, the Should Cost team will have as a minimum, a team chief, an administrative officer, three sub-team chiefs and several functional specialists. Included in the last category will be engineers, primarily those with an industrial engineering background, price analysts, auditors, contract specialists, and management analysts. Both civilian and military personnel participate on Should Cost teams.

In undertaking this study, the initial intent was to provide specific guidance in terms of traits, characteristics and performance ratings that might make the selection process virtually automatic. However, there is no perfect mechanical solution to the selection process. In a Should Cost team, like in any other business oriented venture requiring the cooperation and coordination of personnel with varied skills and backgrounds, staffing remains a major function of the management process, as important as the planning, organizing, directing and controlling phases.

TEAM CHIEF
AND
DEPUTY CHIEF

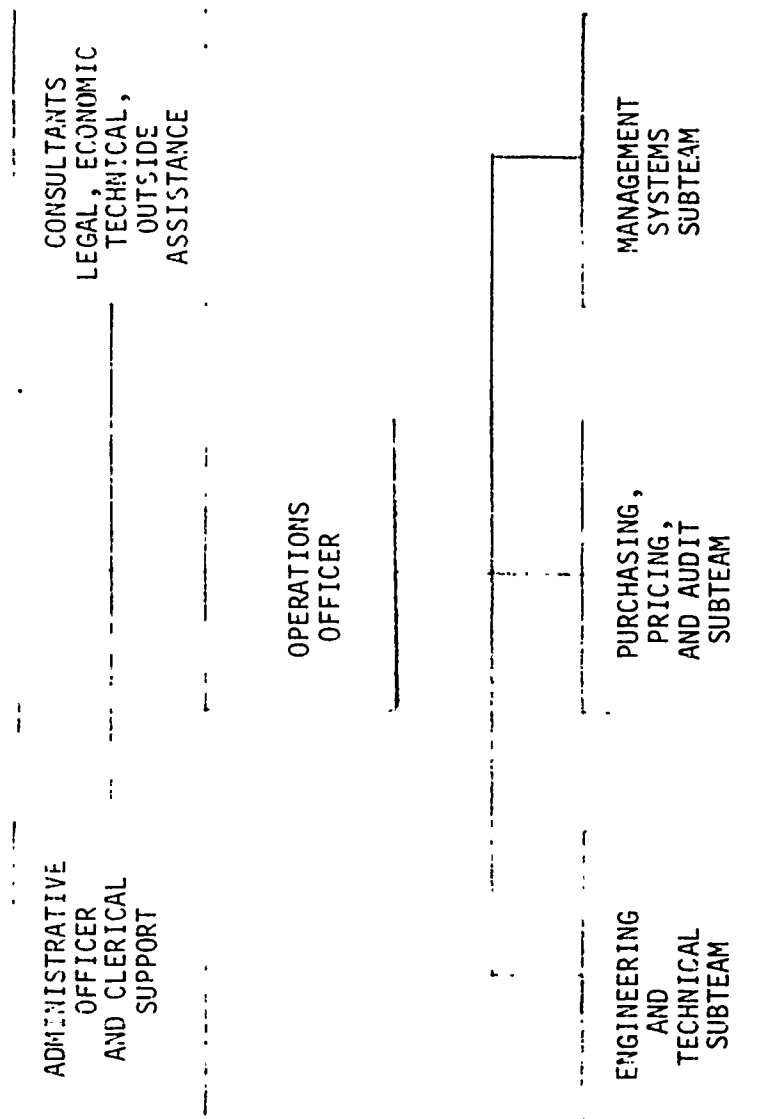


FIGURE 1

TYPICAL FUNCTIONAL SHOULD COST TEAM ORGANIZATION

Four sources of data were utilized as the basis for this research study:

1. Literature on personnel selection procedures and techniques.
2. Performance and biographical data for persons who served on the first eleven AMC Should Cost teams.
3. Should Cost team chiefs' appraisals of team members' performance.
4. Interviews with individuals involved in the selection of personnel for previous Should Cost teams.

Based on these data, guidelines for the selection of Should Cost team members have been developed. These guidelines are contained in Chapter V, Part C. The guidelines have been written so that they may be furnished, independently of this report, to newly designated team chiefs. Also, this format will allow the guidelines to be readily incorporated into AMC Pamphlet 715-7, "Should Cost Analysis Guide."

D. Factors Inhibiting the Development of Selection Criteria for Should Cost Personnel

1. Attributes of "successful" employees contained in personnel and business literature tend to be written for positions that do not correspond to those skills required on a Should Cost team. Also, many of these listings of traits and characteristics are essentially qualitative in content and usually represent a consensus of opinion rather than being the product of a validated personnel research study.
2. To develop in a valid manner, those characteristics which differentiate "relatively successful" from "relatively unsuccessful"

performers, requires the existence of valid performance appraisals. A review of annual performance appraisals for AMC employ, indicates that they are likely to be biased toward the high side by what is known as "leniency error" on the part of the rater. A similar conclusion can be made regarding performance appraisals by Should Cost team chiefs, especially in those instances where the team chief and team members are from the same command.

3. An inherent difficulty in establishing characteristics and tangible factors for the selection of Should Cost personnel is the heterogenous make-up of the teams. Should Cost teams include both military and civilians (whose motivation, and consequently performance, may well differ), personnel from both within and outside the activity conducting the Should Cost analysis, technical personnel (engineers of various disciplines, price analysts, etc.) and non-technical personnel (management analysts, procurement analysts, industrial specialists, etc.). This is further compounded by the fact that some people serving on Should Cost teams will function in a supervisory capacity while others will not, whether their permanent position is or is not supervisory in nature. Additionally, both objectivity and continuity are continually emphasized; yet these two conditions are not always compatible. Continuity, or association with a program, indicates familiarity which may cause one to be subjective in evaluating the program. Conversely, objectivity may best be achieved by lacking association with a program.

CHAPTER II

PERSONNEL SELECTION - A REVIEW OF THE LITERATURE

An extensive survey of literature in the fields of personnel administration and industrial psychology was performed. One of the first observations resulting from this survey is that if one looks long and hard enough, he should find something in writing to support his particular point of view. Stone and Kendall recognized this problem in 1956 when they noted that:

It is apparent from even this brief examination of the research on employment interviewing that wide differences of opinion and interpretation exist as to the value of the employment interview. Unfortunately, the exponents of these divergent opinions can all cite research evidence in support of their respective views.¹

Also complicating the task is the large amount of literature available. For example, Mayfield, in a ten-page summary of his comprehensive review of literature on the selection interview cites 88 references.² Additionally, he notes that he reviewed over 300 articles since the last comprehensive review was made in 1949 and found that over 75 percent gave opinions while less than 25 percent reported actual experimental studies.³ Dunnette and Kirchner in their small book (235 pages) cite 222 references.⁴ One final example of the abundance of literature is that in the book

¹C. Harold Stone and William E. Kendall, Effective Personnel Selection Procedures (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1956), p. 206.

²Eugene C. Mayfield, "The Selection Interview - A Re-evaluation of Published Research" in Managing People at Work, Readings in Personnel by Dale S. Beach (ed.) (New York: The Macmillan Company, 1971), pp. 95-99.

³Ibid. p. 86.

⁴Marvin D. Dunnette and Wayne K. Kirchner, Psychology Applied to Industry (New York: Appleton-Century-Crofts, 1965).

Managerial Behavior, Performance, and Effectiveness by Campbell, Dunnette, Lawler, and Weick, 781 references were cited.⁵

Another problem in the review is that very little literature concerning the selection process can be found which relates to the types of skills that are normally required on a Should Cost team. There is an abundance of literature on blue-collar workers, office workers, and managerial and executive jobs, but very little on the professional who functions in a non-supervisory or low-level supervisory capacity. And when articles can be found citing the traits desirable in a type of person whom we might find serving on a Should Cost team, we find that these are often based on either individual or group opinions with no assurance as to their validity. Notwithstanding the difficulties cited above, this chapter will attempt to relate significant aspects of the various personal characteristics and techniques that are commonly considered in a well-developed selection process and, where possible, relate these findings to the situation at hand, i.e., the selection of Should Cost team members.

While the following discussion may appear to emphasize the negative aspects of many of the selection devices, this is done with a purpose - to point out that the ideal candidate is seldom seen, so it is impractical to establish a set of qualifications so rigid that few applicants can meet them.

A. The Selection Process

The success of a selection system, whether it be informal or highly structured, depends basically on two factors: one is the diversity of the

⁵ John P. Campbell and others, Managerial Behavior, Performance, and Effectiveness (New York: McGraw-Hill Book Company, 1970), pp. 500-528.

available candidates and the other is the extent to which selection techniques consistently measure characteristics that are actually related to job performance. In staffing a Should Cost team, we are looking for individuals who possess certain skills built on knowledge and insights gained through formal education and experience. These individuals need to be knowledgeable and capable in certain specific functional areas, and they must be motivated to apply these abilities and skills to achieve results. Hinrichs states that this kind of individual must possess a considerable amount of native ability, which he defines as:

a unique mix of innate intelligence or brainpower, plus a certain degree of creativity or the capacity to go beyond established stereotypes and provide innovative solutions to the problems in his everyday world, plus personal skills which make him effective in his relationships with his peers, his superiors, and his subordinates.⁶

Inherent in the establishment of formal criteria to identify the best available talent is the fact that we hope to also identify those persons who are considered marginal performers and should merit no consideration at all. However, such an objective also incurs the risk of placing some people in this category who would actually be excellent performers. Selection systems work on the principle of comparing one individual to a large group of people having similar characteristics and stating the probability of his success in terms of the historic record achieved by this group. Thus, assuming that an improved selection methodology is valid and reliable, it will eliminate a large number of potentially unsatisfactory employees (and some potentially satisfactory employees) and thus increase the proportion of those who are satisfactory. If, however, most employees selected without the benefit of a

⁶John R. Hinrichs, High-Talent Personnel (New York: American Management Association, 1966), p. 11.

specific selection technique are satisfactory, the chance of obtaining significant improvement by incorporating this additional technique into the selection process will be limited.

b. Nomination

One method of identifying candidates is nomination, either by a supervisor or self-nomination. The efficiency of these approaches is questionable. The supervisor who is asked to nominate an employee to serve on a special project (a Should Cost study, in this case) usually gets little useful guidance on what is desired and what the employee is expected to do. Nor is it to his advantage to nominate his best employee even if he does understand the scope of the special project, for his chief reward will be that he will lose that employee for some time.

Self-nomination, while it can increase the number of employees available for consideration, can also be ineffective, primarily because we do not know if the employees are volunteering because of the nature of the work involved or for personal reasons.

c. Job Requirements: Defining the Job

Industrial psychologists and personnel administrators are in complete agreement on one point: any attempt to select personnel for a specific assignment in an orderly, rational manner must first be preceded by defining the position. You cannot place someone in a job that will be suitable for their talents unless you first know the requirements for that job. This point has an important place in the staffing of Should Cost teams: one must have a reasonable idea of the team size and skill mix which will be

required to conduct the analysis and the specific tasks that comprise the basic steps in the analysis.

Donovan reinforces the importance of job analysis:

...the starting point in actually developing selection procedures and devices is job analysis ... job analysis for selection purposes differs from the analysis of duties and responsibilities for position classification. Not only must ... [one] possess valid information as to major and minor duties performed in a position, and the knowledge, skills and abilities required, but he also needs to know something about the desirable traits and the relative importance of each as exhibited by successful workers.⁷

Factors which are often specified as job requirements include experience, education, responsibility, persuasive skill, ability to get along with people, supervision, writing skill, informal speaking skill, initiative, innovativeness and concrete examples of demonstrated performance. To establish too rigid a set of qualifications however, which few applicants will ever match, will result in a "dream sheet" of little value.

There are two general approaches to establishing job requirements. One way is to classify them as "minimum qualifications", "desirable qualifications", and "optional qualifications". Another approach is to establish a minimum requirement for each factor and an upper limit, which

⁷J. J. Donovan (ed.), Recruitment and Selection in the Public Service (Chicago: Public Personnel Association, 1968), p. 13. (In the section on "Characteristics of Successful Individuals," it will be shown that no single set of personal traits essential to jobs that are similar to those that are required on a Should Cost team has yet been established to the general satisfaction of industrial psychologists and personnel specialists. In Chapter III, the problem of identifying "successful" workers within AMC is discussed).

would be the maximum level which one could fairly expect applicants to attain, and then to develop a rating scale for each factor.

D. Selection Methods

Dale notes that:

Given two or more candidates for a job there is no absolutely sure way of selecting the best one. Whether the position is that of sweeper or vice-president, the only tools available are examination of the candidate's past record, tests of actual performance in a trial situation (frequently not possible), psychological tests of various kinds and the interview. These methods are not infallible either separately or together. . . . At any rate no amount of testing, interviewing, or examination of past records, as nearly as they can be ascertained, will enable a company to feel absolutely sure that it is really getting the best among the applicants who offer themselves. Certain errors may be avoided but that is about all This is not to say that any part of a selection process should necessarily be omitted, only that there should be greater emphasis on the most important qualification for the job. . . . Further, there should be less a priori reasoning in developing selection procedures. . . . If the obstacle course is so arranged that only one, or at best two or three, candidates survive it, the man who makes the final decision is deprived of the opportunity to handle the staffing part of his management function, which in the end is a matter of judgment that can be exercised only by the manager himself.⁸

There are many reasons why the selection process goes wrong. It may be a case of not enough information, or even one of too much information, but, unfortunately, information which is not an accurate indicator of job performance. Another cause may be "selective perception". This is a natural human characteristic which tends to place too much emphasis on first impressions. Sometimes the selection process fails because a given candidate has something in his background which either conforms to a bias

⁸Ernest Dale, Management: Theory and Practice (second edition; New York: McGraw-Hill Book Company, 1969), pp. 373, 381 & 382.

of the prospective employer causing the candidate to be hired, or is in conflict with the prospective employer's bias, thereby causing the candidate to be rejected. The selection methodology for hiring people is, unfortunately, often far less rigorous than the decision process for purchasing new equipment or investing capital.

Authorities in the field of personnel administration readily agree that ready-made selection systems, without local validation or local comparison with alternative techniques, succeed more on the basis of luck than on design. Selection programs must be tailored as specifically as possible to the nature of the particular organization and the jobs which are to be filled.

Generally speaking, there are two approaches to formal personnel selection: one is the statistical approach, the other is the clinical approach. Hinrichs describes these two approaches as follows:

The statistical approach. The psychologist who is oriented to the statistical approach says that selection should be viewed as a process of evaluating the extent to which a candidate will resemble currently successful employees in terms of characteristics which research has shown to be related to success in the organization. The hiring decision usually is based on a statement that, as a result of the selection factors evaluated, the probability is X that the candidate will be a successful employee.

Whatever the technique used or the selection inputs which are evaluated, the research procedures in developing the statistical prediction are essentially similar. The inputs are quantified in some form - biographical data, test scores, ratings which result from interviews, credit references, school records, and the like. These data are then used to compare a group of present employees who have been evaluated as successful or high producers with a group who are unsuccessful or low producers. On the basis of the

differences between these two groups, a technique for predicting success or productivity is developed, checked out independently, and put into use. Essentially, the rationale says: 'If present more or less successful employees have such and such characteristics, the sensible thing to do is to hire people who resemble them in that they have these same characteristics. Over the long run, if we use this procedure, we should hire more good people than we do bad.'

The clinical approach. The psychologist who is clinically oriented views each selection decision as an individual case. He attempts to learn as much as possible about each candidate and each specific job and to evaluate these independently without considering in any way the total pool of candidates available or the statistical probabilities of group differences. He uses his knowledge of people and his experience to arrive at an essentially subjective judgment about the appropriateness of hiring each individual candidate. Although he may evaluate the same data that are used in the statistical approach, he interprets them intuitively rather than comparing the candidate against statistical norms.⁹

In either case, but especially in the statistical approach, one must be able to differentiate between the above-average and the below-average employees currently on board so that he can attempt to hire new employees with characteristics and traits that will conform with those for persons who already are successful. In Chapter III, the difficulty of using this approach, where there is a question as to the validity of the performance ratings, will be discussed.

In subsequent sections, we will look at the various devices that are used for assessing individual differences. Table I presents a listing of the devices that are normally available and the applicant characteristics that they best describe.

⁹Hinrichs, op. cit., pp. 87 & 88.

TABLE I

Applicant Characteristics and Devices for Appraising Them

	<u>Characteristics</u>			
	<u>Knowl- edges</u>	<u>Abili- ties</u>	<u>Apti- tudes</u>	<u>Person- ality</u>
Application Blanks -----	A	A		
Weighted Personal Data Forms -----	A	A		B
Written Tests -----	B	R	B	
Performance and Situation Tests -----	A	B	B	B
Personality and Interest Inventories --				A
Ratings of Training and Experience ----	A	A		
Physical Examinations -----		A	A	
Background and Reference Checks -----		A		A
Oral Examinations -----	A	A		A
Appointment Interviews -----	A	A		A
Probation Period -----	A	A	A	B

NOTE - The "A" and "B" entries under the various "Characteristics" columns in the above table signify as follows:

"A" indicates devices which attempt to measure the particular characteristic.

"B" indicates the devices which research has shown to be generally best for appraising the particular characteristic.

Source: J. J. Donovan (ed.), Recruitment and Selection in the Public Service (Chicago: Public Personnel Association, 1968), p. 359.

Two significant problems that arise from using these techniques are highlighted in the following quotes:

. . . one of the most common errors in selection is the failure to relate the information obtained from several methods effectively in arriving at the final decision to hire or not to hire. Too often, predilections for or prejudices against particular selection methods, without reference to their validity or to the overall picture of the applicant that has been obtained, result in ignoring the results of all but one favored method.¹⁰

Many of the current notions that find their way into job specifications, such as specific kinds and lengths of experience, recency requirements, and positive education requirements, come to be regarded not simply as ways of estimating the probable existence of a particular desired ability; but rather as the ability to be sought itself. Most such notions are still hypotheses; in most cases we have not established that persons who meet these kinds of requirements are in fact superior employment risks.¹¹

After reviewing these appraisal devices we will then look at the characteristics that are most often considered in personnel selection and that may be relevant in selecting Should Cost team members.

E. Weighted Application Blank

The weighted application blank is essentially the quantifying and weighing of personal-history information from an application blank or resume to provide a predictive score of the applicants' success in a job.

According to the American Management Association, "Biographical information blanks should be constructed by a person professionally trained in industrial psychology. Interviews with successful and less successful occupants of the job under consideration provide the researcher with leads

¹⁰ Milton M. Mandell, Recruiting and Selecting Office Employees (New York: American Management Association, Inc., 1956), p. 63.

¹¹ Donovan, op. cit., p. 257.

for questions. . . . Through an often complicated statistical process, optimum weighting of the item is obtained and scoring procedures are worked out. The eventual user of the questionnaire is able to score it and interpret the biographical information blank as if it were a test."¹²

Hence, its construction is built upon the "statistical" approach to selection; it is not a ready-made test, but must be developed in light of the particular situation.

The value of this technique is contingent upon three key points: first, the accuracy of the biographical data, secondly, a sufficiently large number of employees who perform jobs of a similar nature to serve as a data base, and last, the foundation upon which personnel selection research is based; namely, that it is possible to identify the relatively successful and the relatively unsuccessful employees.

"Since biographical inventories first came into wide use about thirty years ago, they have been used in a large variety of studies and in many selection programs. Very often, a carefully developed typical behavior inventory based on biographical information has proved to be the single best predictor of future job behavior."¹³

The relative success of the weighted application blank is attributed largely to the fact that one of the best predictors of future behavior is past

¹²Russell F. Moore, (ed.), AMA Management Handbook (New York: American Management Association, Inc., 1970), p. 3-112.

¹³John P. Campbell and others, Managerial Behavior, Performance, and Effectiveness (New York: McGraw-Hill Book Company, 1970), pp. 145 & 146.

behavior. (This is in contrast with personality tests where, as will be discussed later, there is no assurance that performance is a function of personality traits).

F. Tests in Selection and Placement

"So much has been written about testing, both pro and con, responsibly and irresponsibly, that anything more than a terse treatment of the subject could easily become a volume in itself."¹⁴

Notwithstanding this excellent advice, a brief review of the suitability of tests in the selection process will be undertaken. This is necessary because so many people, ignorant of the finer points of personnel selection, immediately think of tests, especially personality tests, as being the surest way to go, primarily because of their "apparent objectivity."

The subject of using tests, especially personality tests, for evaluating applicants is an area that has stirred considerable controversy among the personnel experts. A psychological test may be defined as any method for obtaining a standard sample of an individual's behavior along with a method for systematically making predictions based upon that sample. Among the various types of psychological tests are intelligence tests, performance tests, trade tests, aptitude tests, and personality tests. A test, in order to be of value, must possess validity and reliability. It is valid insofar as it measures what it is supposed to measure, and reliable insofar as it gives consistent results. The most carefully constructed test is no better in the selection process than the skill with which it is utilized and evaluated and the appropriateness of the

¹⁴Saul W. Gellerman, Management By Motivation (New York: American Management Association, 1968), p. 94.

criteria against which it is validated. A test must be built on a careful analysis of the skills and abilities that are required for a particular job and must be validated against the performance of those personnel currently performing the job.

Psychological tests are usually applied as follows:

For a given job we agree what the marks of a relatively successful and of a relatively unsuccessful worker are. We devise a very large test containing many, many items (which we may privately hope have some relation to the job) and test a large group of applicants. Then, later, we identify those who have been successful and those who have been unsuccessful and go back to the original tests. We examine each item individually to see how our successful and our unsuccessful group did on it. If, for instance, 80 percent of the ultimately successful men answered it correctly and only 20 percent of the unsuccessful group did, we keep it because it discriminates as intended. On another item the percentages may be different. Let us say that 28 percent of the successful group got it right and 24 percent of the unsuccessful group [did]. We throw the item out - 'does not discriminate.' Our final product is an aggregate of those items that did work, and we use this (tentatively) on the next batch of applicants."¹⁵

But all does not end there. In fact, many of the problems just begin. First, experts in the field of testing demand a relatively large sample. If only a few employees are doing the exact same kind of work, the results will have limited reliability for selecting future employees. Secondly, if tests are to be used to predict efficiency of job performance, a valid and reliable measurement of performance must be available against which to judge the value of the test. Thirdly, no matter how well the test is constructed, it has no inherent validity in itself. It is only valid in relation to a specific job

¹⁵ Mason Haire, "Use of Tests in Employee Selection" in Readings in Managerial Psychology, by Harold J. Leavitt and Lewis R. Pondy (eds.) (Chicago: The University of Chicago Press, 1964), p. 165.

situation or a specific skill and the validation process must be a continual one. Also, there are

very few tests [that] can be taken over directly and applied to new situations. They must be checked and rechecked and adapted to the particular plant....The psychologist who handles the testing will - and rightly so - be very particular about the ratings that he will accept as a criterion against which to validate his tests. ...The job is not finished when the test is installed. Just as a test for file clerks which has done successful selection for Company A must be revalidated in Company B's case before it can be used with safety, a test that works today has to be constantly rechecked and validated to adjust it to the changing situation.¹⁶

Haire also notes that the easier a skill is to measure, the less likely it is to be of primary importance in the job situation, and that a major drawback of using results from a testing program is that one becomes overly dependent upon them, to the exclusion of other selection devices, to such an extent that

he no longer understands in the same way as before, why he hires or rejects a given individual. There is no longer the same simple relationship between the requirements of the job and the reason for hiring or not hiring....It may be true that what we have done in testing the applicant is to simplify the employment decision by regularizing and standardizing the assessment of factors involved in success on the job. But it often smacks so of a convenient and approved way to avoid the decision that it seems worth while to ask ourselves to what extent we do have a solution and to what extent an escape?¹⁷

In a similar vein, Hinrichs notes that

Unless there is continual emphasis on the fact that a test score is merely an additional input to the selection decision, managers

¹⁶ Ibid., p. 168.

¹⁷ Ibid., pp. 164 & 172.

sometimes come to accept the test score as a magical mathematical index which may be used routinely as a base for hiring. Quantification of the selection input is conceptually appealing and, too frequently, leads managers to neglect the difficult but vital job of exercising informed judgment.¹⁸

Nor is there any assurance that tests will yield a direct measure of the ability in which we are interested. Rather, they may yield scores which are associated with the ability, but where the apparent cause-and-effect relationship is spurious.¹⁹

Personality tests deserve added comment. Such tests attempt not to measure proficiency, skill or ability but rather attempt to measure personal traits, attitudes and emotional qualities as cues to one's motivations and work habits. One major objection to personality tests is the proven fact that a candidate may either consciously or sub-consciously slant his replies in a direction which he believes to be most favorable.

A few quotes about personality tests will be sufficient to make one proceed with caution in recommending their use:

Few, if any [of the existing personality assessment devices], can be recommended for use as an employment device.²⁰

[Personality tests]... in industry... are of considerably more value as a placement or counseling guide than as an additional input to the selection evaluation.²¹

¹⁸ Hinrichs, op. cit., p. 108.

¹⁹ Haire, op. cit., p. 165

²⁰ Donovan, op. cit., p. 110.

²¹ Hinrichs, op. cit., p. 111.

. . . there is also immense difficulty in devising a test of this kind in such a way that the applicant cannot guess the answers that the psychologist has decided are the right ones. . . . a test of this kind may work very well for a vocational counselor whose clients are really seeking to learn what they are best fitted for, but not at all in a situation where people are trying to get a job. An applicant cannot fake the answers to intelligence, aptitude, or trade tests in this way For this reason, there is more controversy over personality tests than over the other types.²²

Before we go any further into the subject of testing, we must face the obvious question of whether tests can be used to determine what kinds of motivation - and how much - an individual has. In most cases I think the answer has to be no. It is true that some tests purport to measure motivation, or something, such as personality traits, that is closely related to it. Whatever these tests measure has not, however, substantially increased the accuracy with which selection systems are able to predict job performance - at least, not in the majority of cases where their effect has been properly weighed. And added accuracy is, in the last analysis, the only valid reason for adding any procedure to a selection system. In most cases, personality tests appear to have added nothing to a selection system but a certain illusory assurance in the minds of the selectors that they are being more "scientific" than they really are.²³

And regarding the feasibility of applying tests in general, the following observations are appropriate:

In order to avoid the subtle persuasion that there is in the idea of psychological measurement, it may be well to approach it this way: Begin on the theory that you do not need and do not want selection tests. Examine the possibilities carefully - their assets and their liabilities. Then if you decide that tests will help, you are on comparatively safe ground. . . . we must use whatever techniques are available - skilled interviewers, weighted application blanks, and perhaps even tests. But, by the same token, we must put an increasing emphasis on training, supervision, and job requirements, so that we will maximize the usefulness of the people we do hire.²⁴

²² Dale, op. cit., pp. 378 & 379.

²³ Gellerman, op. cit., p. 95.

²⁴ Haire, op. cit., p. 173.

Only when a company sees that it has a problem that may best be solved by developing a test program, should it develop one - and then only if the estimated return justifies the estimated cost. . . . Developing a testing program should not be a do-it-yourself project. It demands the use of competent, qualified personnel who are familiar with the myriad of technical details required for the adequate development and evaluation of selection devices.²⁵

There are hundreds, if not thousands, of tests that an employer can purchase to use as an assist to employee selection. Employers are fond of using them because it relieves them of some of the decision-making responsibility. The easiest ground rule to follow here is don't, without advice from a competent industrial psychologist. The claim that a test measures intelligence, supervisory ability, adaptability, or any one of dozens of other traits is absolutely no indication that it does so. The trained and experienced industrial psychologist knows which tests have worked well elsewhere; he knows how to evaluate the test publisher's claims of what the test will do; and he knows how to find out, factually, whether the test will be of value for this particular organization with its particular set of employment needs.²⁶

There is one area where the experts generally agree that an employer may develop his own testing program; this is skill tests. While skill tests generally refer to those tests that measure clerical skills and the like, certain situational tests, made a part of an interview, can be appropriate, if properly developed. This is discussed in the section on interviews, where it is also mentioned that the holding of a training session, such as the Should Cost Workshop, immediately prior to the commencement of the analysis, may provide the best form of assessing one's ability to function capably in a Should Cost environment. For these reasons and because most personnel selected for Should Cost Teams to date have been considered to have performed satisfactorily, it is not deemed appropriate at this time that a formal testing program be considered as a feasible technique for selecting Should Cost team members.

²⁵ Beach, op. cit., p. 102.

²⁶ Moore, op. cit., p. 3-28.

G. References

The value of contacting references whose names have been supplied by prospective team members is dubious. The same may normally be said for letters of appreciation. Stone and Kendall note that

Letters of recommendation carried by an applicant are worthless in obtaining an accurate and unbiased appraisal of his personal character or his worth to an employer. . . . Personal character references supplied by the applicant must also be discounted heavily. . . .[and] There is serious question. . . as to how much reliance may be placed on any written reply to inquiries addressed to references.²⁷

When inquiries of references are to be made, telephone calls are generally preferred over written communications since there is a tendency among many persons not to put unfavorable comments in writing. The real problem with relying on references is that, as one wit has observed, "Everybody has three friends."²⁸

H. Interview

The interview is the most universally used of all selection techniques and is often relied upon more than any other technique. While few would recommend the hiring of an individual without having interviewed him beforehand, one must question the value of the interview, especially in light of the following views:

Any adequate survey of scientific evidence will show that the interview is an anachronism in psychology, for the preservation of which, as an assessment device, there are many excuses but few justifications.²⁹

²⁷ Stone and Kendall, op. cit., pp. 175 & 179.

²⁸ Campbell and others, op. cit., p. 34.

²⁹ Donovan, op. cit., p. 212.

There are many areas of interviewing which have been hardly touched by research. . . . Many psychologists claim that the addition of an interview to other validated selection devices in many cases reduces, rather than increases, the final validity of a selection. There are data both to support and to contradict this point of view.³⁰

The basic difficulty of this type of interview, as usually conducted, is that it involves making extensive inferences from limited data obtained in artificial situations by unqualified observers.³¹

. . . one frequently finds definite statements of procedures to follow to assure good selection interviewing. This would seem to indicate that studies are available which have been concerned with the interviewing process as well as with results per se, and which have investigated the value of such procedures and techniques in actual interview situations. However, such studies are not as common as one would hope. Often it turns out that such statements of rules and procedures are based on generalizations from studies carried out in fields other than interviewing.³²

England and Patterson have suggested: ". . . a moratorium of books, articles, and other writings about 'how to interview', 'do's and don't's' about interviewing and the like, until there is sufficient research evidence about the reliability and validity of the interview as an assessment device to warrant[sic] its use in such work."³³

With such a negative attitude towards interviewing, why then is so much emphasis placed upon the interview? A few writers have suggested that the interview is for the sake of the interviewee. It is done to give one some idea as to the sort of situation into which he might be hired. Most writ.

³⁰ Milton M. Mandell, The Selection Process: Choosing the Right Man for the Job (New York: American Management Association, 1964), p. 253.

³¹ Stone and Kendall, op. cit., p. 205.

³² Beach, op. cit., p. 88.

³³ Ibid., p. 86.

however, feel that the interview is usually conducted for the sake of the interviewer. He wants an "eyes on" evaluation of the candidate and the interview carries with it a large amount of "face validity" - most people feel they can do a very good job of evaluating an applicant's qualifications if they can just sit down and chat with him for a short while.³⁴

Where interviewing really fails is when it is conducted on a highly informal basis. In almost all cases where a satisfactory reliability for the selection interview has been reported, the interview has been of a structured form.³⁵

The trouble with unstructured interviews is that material is not consistently covered, the same question is asked in different forms to the applicants, and much of the information discussed is of the factual, biographical type already contained on the application form. "In the usual unstructured employment interview, the interviewer talks more than does the interviewee. . . . This finding shows that many interviewers violate the commonly stated rule that the interviewee should do most of the talking. Unfortunately, the rule itself has little factual evidence to support it."³⁶ It is generally agreed by researchers that interviewers tend to make their decisions early in an unstructured interview and that a great deal of the decision is likely to be based on manner, facial expression, and personal appearance rather than on information obtained during the interview.³⁷

³⁴ Hinrichs, op. cit., p. 95.

³⁵ Beach, op. cit., p. 92.

³⁶ Ibid., p. 93.

³⁷ Ibid., p. 94.

The use of a structured interview will also lead to a high inter-rater reliability, meaning that if one cannot interview all applicants personally, he is in a better position to value the findings of another interviewer.

A variation to the interview that might increase its value would be to allow working level non-supervisory personnel to participate in the interview, for they may be better able to evaluate a candidate's techniques and professional skills. "The 'bench level' working professional can very quickly tell whether a potential candidate knows his field or whether he is putting up a 'snow job,' whereas a manager will often be less successful in this evaluation."³⁸

In conjunction with this, the interview should stress questions which might be indicative of the applicant's knowledge in a certain area. For example, if an industrial engineer is being interviewed for a position on a Should Cost team, it seems only common sense to query him about his knowledge of job standard, work measurement techniques, and manufacturing processes. Another variation that may prove feasible is the group discussion, either with a leader, or leaderless, where a small group of industrial engineers might be interviewed jointly and presented with a series of short problems to discuss.

The leaderless group discussion has received a large amount of favorable comments in personnel selection articles. The approach consists of having

³⁸ Hinrichs, op. cit., p. 83.

a group of examinees carry on a discussion about a selected topic. No leader is appointed and the examiners do not participate, but rather remain on the sidelines as observers. This method provides a relatively unstructured but directed opportunity to observe applicants' behavior in interaction with other persons.³⁹ Such situational tests are thought to be one of the most effective techniques for the prediction of behavioral patterns.

The essence of a situational test is that men are presented, singly or in groups, with a more or less real problem to solve and they are observed as they try to organize themselves to grapple with it. They receive relatively little guidance or instruction on how to proceed and therefore they tend to become preoccupied with the problem itself and to be much less conscious than they ordinarily would be of the fact that they are being observed. Specially trained teams of line managers act as observers, rating the men's performance but not aiding them or questioning them as the exercises progress.

Situational tests are admittedly only an approximation of real managerial behavior, but they are a much closer approximation than most tests, interviews, and other off-the-job procedures can provide...[and they] offer much better conditions for observing and measuring a man's performance than most on-the-job contexts provide.⁴⁰

While situational tests are mostly used in predicting managerial effectiveness, it is not difficult to visualize their applicability to the Should Cost environment. In fact, this is possibly a very strong argument for conducting training, such as the Should Cost Workshop, immediately prior to the beginning of the study. Such training sessions will provide the

³⁹ Campbell and others, op. cit., p. 140.

⁴⁰ Geilerman, op. cit., pp. 121 & 122.

team leader with an excellent opportunity to evaluate the potential performance of team members. The only difficulty here is that it might be wise to actually have more personnel in the training session than will be required to perform the analysis so that if individuals are to be rejected on the basis of their performance during the training session, there will be trained alternates available. If the training session is to contain more people than will be on the team, it would be best to not even decide who will actually be on the team until after the Workshop is completed. In this way, those who desire to serve on the team will be motivated to perform best during the Workshop and, hopefully, their performance will attract the attention of the team leaders.

The key points that should be remembered are that in the best selection programs the interview will be only one of a number of selection methods used, that structured interviews tend to have greater reliability than unstructured ones, that combining the evaluations of several interviewers on a single applicant may serve to reduce the bias of any one interviewer, that allowing knowledgeable journeymen to serve as interviewers may result in a better evaluation of technical skills and knowledge and that interviewing several applicants for the same position, on a group basis, may provide valuable insight into leadership traits and problem-solving abilities.

I. Characteristics of Successful Individuals

In the section on performance appraisals, the problem of defining success or any other measure of performance level will be discussed. Notwithstanding

this problem, one of the primary reasons for conducting a survey of the literature was to determine what existing guidance there is on those characteristics identifiable of "successful" individuals.

The articles which do list various characteristics and attributes were found to not usually pertain to the types of skills that are required on Should Cost teams. Most often, these studies relate to "blue collar" workers, clerical help, salesmen, managers, and executives.

Another problem with the literature concerning desirable qualifications is that much of it appears to be highly opinionated with little basis on specific research. Oftentimes the title of the article is indicative of the opinionated content. For example, this review uncovered such articles as "Seven Executives You Should Never Hire", "Executive Selection: How Many Points for Charm?", "The 'Effective' Executive: What Qualities Make the Difference?" and "These Traits Make Capable Executives: Survey Shows Way to Predict Success of Managers".

Even those articles that have a strong foundation on research can be highly inappropriate. For example, O'Donovan in "Differential Extent of Opportunity Among Executives and Lower Managers" concludes that

The research conducted for this study confirms other findings that suggest that our nation's executives are largely a product of middle and high occupational origins. Those executives today without such an advantaged background generally had a slower career speed and had to overcome a great deal of obstacles to get ahead. Even more importantly, the sons of unskilled workers and other working groups tend to lack the desire and motivation for high status achievement in most cases. At the outset of his occupational career, the worker tends to set a high aspiration level for himself only if he possesses the value system of middle class or higher social origins. Without this type of background, he may often lack not only technical qualifications for high status positions, but he tends not to be

exposed during his childhood to the values which are associated with that type of behavior leading to corporate promotion. . . . In short, the person who does not actively desire high status achievement is less likely to attain it. These values are related to the cultural heritage of the individual. Therefore, the occupational origins of individuals are highly related to subsequent career level achievement.⁴¹

To advocate such an "anti-Horatio Alger" approach and suggest that family status be an important criterion for selection on Should Cost teams would be laughable from the outset.

To further emphasize the futility of trying to rely upon the literature for identifying characteristics that might be appropriate to Should Cost team members, several articles will be quoted.

Marvin lists ten "checkpoints" which he believes call attention to capabilities critical to effective action. These checkpoints which "help a man highlight his strengths and weaknesses. . . . are drive, responsibility, analytical ability, creative capacity, foresight, communicative skills, technical proficiency, sociability, resourcefulness, and judgment."⁴²

The literature of executive development is loaded with efforts to define the qualities needed by executives, and by themselves these sound quite rational. Few, for instance, would dispute the fact that a top manager needs good judgment, the ability to make decisions, the ability to win respect of others, and all the other well-worn phrases any management man could mention. But one has only to look at the successful managers in any company to see how enormously their particular qualities vary from any ideal list of executive virtues.⁴³

⁴¹ Thomas R. O'Donovan, "Differential Extent of Opportunity Among Executives and Lower Managers," Academy of Management Journal, V (August, 1962), 148.

⁴² Philip Marvin, Management Goals (Homewood, Illinois: Dow Jones-Irwin, Inc., 1968), pp. 31-43.

⁴³ Perrin Stryker, "The Growing Pains of Executive Development," Advanced Management, XIX (August, 1954), p. 15.

One study did an intensive survey of the literature on what factors contributed to managerial success and noted that

The various lists of desirable managerial traits gleaned from these many sources seem to include just about every human virtue. Below is a short summary of personal qualities said to be necessary for managerial effectiveness:⁴⁴

Able to sustain defeat	Extraverted
Alert	Fearful of failure
Ambitious - achievement-oriented	Group-oriented
Assertive	Honest
Capable of good judgment	Intelligent
Competitive	Mentally healthy
Concrete	Optimistic and confident (as a cover-up for fear of failure)
Creative	Pragmatic
Decisive	Predictable
Dedicated	Reality-oriented
Dynamic	Self-controlled but defensive
Emotionally stable	Tolerant of frustration
Energetic	

The authors observed, as this report has, that while

. . . it is informative to consider briefly the essence of these conjectures as a prelude to our discussion... The business literature is full of commentary, speculation, and expressions of opinion...[that] are nearly always based on insufficient evidence - ranging from anecdotes derived from personal experiences to results of opinion surveys and managerial appraisal

⁴⁴ Campbell and others, op. cit., p. 7.

programs... Listing qualities is an appealing pastime, but the trait descriptions are loosely defined, and they do not pinpoint with sufficient precision the behavioral elements making up effective management.⁴⁵

While the above quotes relate primarily to the identification of potential managers or executives, in our survey of literature we finally found listings of qualifications for some of the skills likely to be required on Should Cost teams. However, the sources were not books on industrial psychology or personnel selection, but rather handbooks on industrial engineering and manufacturing engineering.

Management must be concerned with the basic characteristics of those who will do industrial engineering work in the company. Naturally, intelligence is one of the basic characteristics required. It should be coupled with an analytical type of mind and a mechanical and computational background, ability and understanding. The successful industrial engineer must be tenacious in seeking correct solutions to the problems under study. At the same time, he must be patient and understanding toward the thinking and viewpoints of others. He must be able to write well and concisely and express himself simply and clearly.⁴⁶

The Manufacturing, Planning and Estimating Handbook lists qualifications for several skills, and observes that "While a successful manufacturing analysis is dependent on many factors, the qualifications of the analyst are the most vital to its success. The analysts must have a broad background, particularly in analytical procedures of observation, recording and organizing of information."⁴⁷ Other characteristics required include

⁴⁵ Ibid., pp. 6-8.

⁴⁶ H. B. Maynard (ed.), Industrial Engineering Handbook (second edition; New York: McGraw-Hill Book Company, 1963), pp. 1-47.

⁴⁷ Frank W. Wilson and Philip D. Harvey (eds.), Manufacturing Planning and Estimating Handbook (New York: McGraw-Hill Book Company, 1963), p. 2-2.

an objective mental attitude, ("familiarity with a particular matter tends to sponsor a sense of complacency"), an inquiring mind, and good writing ability.⁴⁸

For an engineer who desires to attain a managerial position, the Handbook states that "The qualities of a good engineer that are desirable also as managerial quantities [sic] have been penetratingly examined by Given: [they include] structural visualization...imagination...analytical power... mathematical ability...productivity...courage...integrity...leadership".⁴⁹

For an estimator the Handbook states that

....it appears that the candidates for cost estimator should possess many of the following traits and background:

1. The ability to reason scientifically.
2. The analytical mind of an engineer.
3. A minimum of 2 years of engineering training, formal or equivalent.
4. Education and experience in motion and time study and methods analysis.
5. General accounting through manufacturing cost.
6. Toolroom experience, tool design experience, and tool troubleshooting.
7. Process planning experience.
8. General knowledge of material composition and metallurgy.
9. Last and probably most important, he should know his plant's machine capabilities and limitations."⁵⁰

⁴⁸ Ibid.

⁴⁹ Ibid., pp. 1-22 & 1-23.

⁵⁰ Ibid., pp. 3-4 and 3-5.

After compiling this extensive list, the Handbook then states that "These qualifications of an estimator are developed through long years of experience. It is almost impossible to obtain the services of an individual with such experience, and companies must therefore settle for less."⁵¹

The idea that one's ability in a given position is dependent entirely upon the possession of certain qualities and that the presence or absence can be assessed during the selection process has been described as the "fallacy of determinism."⁵²

The difficulties that result from the mere listing of desirable traits and attributes are best summarized by Gellerman:

Begin with, many companies still have a predilection for rating their managers in terms of a list of adjectives that are somebody's idea of what a manager ought to be like. These usually sound like a grown-up version of the Boy Scout Oath: Instead of being brave, clean, and reverent, the manager is typically expected to be decisive, articulate, and aggressive - or some other combination of qualities that one can hardly quarrel with. Aside from the unlikelihood that any mortal manager will ever be found who can look good if measured honestly against such sterling criteria, there are serious weaknesses in the adjective approach. For one thing, the words mean different things to different people and so lead inevitably to a hash. Further, the adjectives are usually rather obviously loaded in a positive or negative direction, so that merely checking them becomes a sweeping judgment of the individual rather than a sharply etched portrait of one aspect of a man. This leads managers to avoid 'indictments' by giving nearly everyone a strongly positive rating. While this is understandable, it makes the ratings nearly useless. Finally, the adjective approach often fails to meet the test of relevance.

⁵¹ Ibid., pp. 3-5.

⁵² Gellerman, op. cit., p. 85.

That is, the qualities described are not always crucial to assessing the value of a man's services, and the adjectives nearly always omit qualities that are more important than those they include.⁵³

As Hinrichs has noted, the talent that we might desire on a Should Cost team is "a blending of capacity of knowledge and of drive or motivation. Thus it is not one single trait or attribute but a combination which in large measure must be evaluated by intuition and clinical judgment. No formula for specifying the exact optimal mix of intelligence, knowledge, and motivation could be determined even if these individual attributes could be precisely measured. . . . As a result, a high degree of judgment, intuition and guess-work is inevitable in selection."⁵⁴

Thus the value of a Should Cost study will depend on what its members accomplish both individually and as a group, not on the traits and characteristics that might describe them.

If the identification of attributes is of such questionable value, what factors, then, can we look for in selecting personnel for the Should Cost team? Hinrichs suggests the following:

1. What the candidate has done so far in his life - his prior accomplishments at work, in school, with his family, and in his extra-curricular activities.
2. His knowledge - his education, training, experience, self-assimilated knowledge, as an indication of what he can do.
3. His capacity to learn and grow - his intelligence and aptitudes.
4. His motives and drives, his interests, his physical and mental health and stamina, as indicators of what he will do.

⁵³ Ibid., p. 138.

⁵⁴ Hinrichs, op. cit., p. 90.

Fortunately, the key elements of these criteria are readily observable and subject to evaluation: previous performance and knowledge. Capacity and the "will do" factors are crucial, to be sure, but usually they have in large measure already manifested themselves in the man's accomplishments and attained knowledge. So the major emphasis should be on a complete and reliable evaluation of the candidate's background.⁵⁵

Katz, in an article of some vintage, but which is still often quoted, has concluded from his analysis of the "skills of an effective administrator" that performance depends on fundamental skills rather than personality traits. These skills are classified as technical skill, human skill, and conceptual skill.⁵⁶ Technical skill involves specialized knowledge, analytical ability within that speciality, and facility in the use of the tools and techniques of the specific discipline. Human skill is primarily concerned with working with people, and conceptual skill involves the ability to see the enterprise as a whole. Katz notes that at the lower levels the major need is for technical and human skills and at higher levels, the administrator's effectiveness depends largely on human and conceptual skills. It is his contention that the three-skill approach makes trait testing unnecessary and substitutes for it procedures which examine a man's ability to cope with the actual problems and situations which he will find on his job.⁵⁷

J. Performance Appraisals

As stated previously, the two problems that concern any appraisal method are validity and reliability. Validity concerns the degree to which the appraisal

⁵⁵ Ibid., p. 93.

⁵⁶ Robert L. Katz, "Skills of an Effective Administrator," Harvard Business Review, XXXIII (January - February, 1955), 9-10.

⁵⁷ Ibid., pp. 13-14.

method actually measures what it was designed and supposed to measure.

Reliability refers to the degree of consistency of measurement provided by the appraisal method. Lack of validity and reliability in appraisals is difficult to detect and even more difficult to correct.⁵⁸

Studies on the validity and reliability of performance appraisals have shown that there are numerous errors which can creep into the system. There is the "leniency error," the awarding of a higher evaluation in one or more traits than the employee actually deserved; the "central tendency" problem where raters evaluate their employees consistently as average; the "halo effect," which is the influence that a rater's general impression of an individual has upon the ratings of that individual on specific traits; and the major problem of varying standards between raters. One study even disclosed that raters who have been at their grade level for four years or more show a consistent tendency to give more lenient ratings than raters who have been at their grade level for three years or less.⁵⁹

Some supervisors find it difficult to be critical in the performance appraisals either because they feel that poor performance reflects more on their supervisory ability than on the individual, or because they find it very difficult to tell an employee formally that he is marginal. Also different raters vary greatly in their interpretation of the information called for on the rating sheet.

⁵⁸Robert J. Bogan, "An In-Depth Analysis of the United States Air Force Officer Performance Appraisal System" (unpublished research report, Air University, Maxwell Air Force Base, Alabama, 1969), p. 47.

⁵⁹Mandell, The Selection Process: Choosing the Right Man for the Job, p. 283.

One study offers two quotes which cast further skepticism about performance appraisals.

'Generally speaking, low grade supervisors tend to attract and to favor low grade men. Their most favorable reports may be expected to concern subordinates much like themselves, who offer little potential rivalry. A keenly intelligent applicant placed under such a supervisor is often quickly classified as a 'smart aleck'. Thus, there may be an unlooked-for wastage of manpower, in which technical fitness is not an issue.'

'The rating is purely subjective, so long as its limitations are recognized it adds some information and balance. It is frequently used by employers as the sole guide in management selection - which, in our experience, is as primitive as substituting a chunk of buffalo tallow for a thermometer. Both will tell you whether it is hot or cold, but only one will tell you how hot or how cold it is.'⁶⁰

One of the major reasons for performance appraisals being of questionable value is that many times they request opinions on behavioral qualities that have never been proven necessary for good performance. Also, the definition of success is such a loose concept that supervisors who rate people as to their success are in fact rating many different things.

Personnel experts are now advocating that more weight be given to actual performance and results on the job, and less to personality traits. Gellerman has noted that

Performance ratings are too often compounded of the 'chemistry' of inter-personal reactions more than of dispassionate measurements of what a man has accomplished. . . . It is not that the search for newer, more sophisticated predictors needs to be pressed much further at this time. The problem is rather that we are not really sure which of our available predictors are worth the investment of time, money, and talent to develop them further. We won't know until much better performance criteria are

⁶⁰ Mandell, Recruiting and Selecting Office Employees, p. 121.

developed to replace the ones we have today - better in the sense of being reasonably precise and independent of anyone's personal judgment.⁶¹

In Chapter III, the shortcomings of the performance appraisal systems used within the Department of Army for civilian personnel will be discussed. But it is noted here that the Army's performance appraisal system appears to be less objective than those used in industry, and there is no indication that efforts are being made to upgrade the objectivity of the Army's personnel ratings or to achieve consistency of ratings among the vast number of raters.

K. Education

The relationship of educational level to job performance is one that has received much comment but little resolution. Miller has stated that we are becoming "a credential society, in which one's educational level is more important than what he can do.... All of us know of individuals who cannot get jobs that they would be able to perform well because they lack the appropriate credentials - whether it is a high school diploma or a Ph.D.... few companies even know the connections between the educational level of their employees and their performance."⁶² It is Miller's contention that more attention, especially in Civil Service hirings, should be given to experience and performance.

Livingston, in a recent article in Harvard Business Review entitled "Myth of the Well-Educated Manager," questions strongly the benefit of academic achievement as a measurement of management potential. Livingston, who has

⁶¹ Gellerman, op. cit., pp. 76, 136, 137.

⁶² S. M. Miller, "Breaking the Credentials Barrier" in Managing People at Work, Readings in Personnel by Dale S. Beach (New York: The Macmillan Company, 1971), pp. 71 & 72.

served as chief executive of both Logistics Management Institute and Harbridge House, Inc.. hits hardest at the value of the Master of Business Administration (MBA) degree, but also questions the significance of academic achievement at the undergraduate level. He states that "experience is the key to the practitioner's skill" and "until managerial aspirants are taught to learn from their own first-hand experience, formal management education will remain second-handed."⁶³ While Livingston is looking primarily at managers, Dalton and Thompson have looked at engineers in particular and have concluded that the performance of engineers peaks in their middle to late thirties.⁶⁴ Although their study looked primarily at design and development engineers, they note that "Questions about management obsolescence are very much in the air today and we have often been asked whether the same kind of age/performance curve is found outside the field of engineering. Our answer is that we do not know yet, but preliminary evidence suggests that this may indeed be the case."⁶⁵ Also of interest is their observation about the importance of continuing education: "When we correlated performance rankings of engineers with courses taken in the previous three years, there was no relationship. In nearly all age groups, the courses did not seem to help."⁶⁶

⁶³ J. Sterling Livingston, "Myth of the Well-Educated Manager," Harvard Business Review 1L (January-February, 1971), pp. 85 & 89.

⁶⁴ Gene W. Dalton and Paul H. Thompson, "Accelerating Obsolescence of Older Engineers," Harvard Business Review, 1L (September-October, 1971), p. 57.

⁶⁵ Ibid., p. 67.

⁶⁶ Ibid., p. 64.

What is it then that makes a certain level of academic achievement become a prerequisite. One student of this problem has concluded that the real significant difference between a college graduate and a non-college graduate is the "potential to grow," and having completed a college curriculum indicates an "ability to think." An individual who has become proficient in a technical speciality through many years of practical experience would normally not be considered an engineer in the broad sense of the word, unless he possesses technical knowledge of other engineering work as might be reasonably expected of a graduate engineer.⁶⁷

Donovan has noted that "Colleges differ tremendously. They adhere to no recognizable standards, offer no uniform courses from college to college, and vary widely in regard to level of work required. A college degree means essentially that the holder has served four years, has conformed to the demands of a particular institution, and has done some work, more or less intellectual, at levels which are unspecified and largely indeterminate."⁶⁸

If one is to place emphasis on a certain educational level, he must also be concerned with the relationship of the educational speciality to the individual's current job. For example, if we are looking at two price analysts, one with Bachelor's and Master's degrees in English literature and the other

⁶⁷ William A. Brummer, "Determination of Manpower Requirements for Scientists and Engineers" (unpublished Master's thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio, 1969), pp. 46 & 47.

⁶⁸ Donovan, op. cit., p. 105.

with only sixty hours of business administration courses and no degree, there is obviously no assurance that the former's education benefits him more on the job than does the latter's.

Also of concern is the fact that when specifying educational levels, too high a criteria may severely reduce the number of applicants available. As an example, to recommend that all procurement specialists and price analysts serving on Should Cost teams possess a Master's degree would be impractical since only 73 of 1,764 personnel, GS-12 and above in AMC, with current procurement/price analyst experience, have advanced degrees. Specifying a Bachelor's degree in an engineering curriculum for engineers serving on Should Cost teams would seem feasible since their school studies are more relevant to later work than is true for non-engineers. Also, within AMC, 80 percent of the nearly 8,000 engineers assigned to the commodity commands are college graduates. However, less than one-third of the 2500 individuals currently serving in procurement/price analysts jobs possess college degrees. For industrial specialists within the AMC commodity commands, less than 15 percent (69 of 517) possess college degrees.

Obviously then, the strict adherence to a minimum educational level will not serve as an effective means of identifying the best workers. In fact, it may tend to exclude a large number of individuals who have achieved high degrees of competence in their specific fields through many years of experience.⁶⁹

⁶⁹ One commercial firm, a leader in the food service business, has applied the educational requirement in reverse; they look mainly for college drop-outs. The personnel director, himself a drop-out, says "It's difficult to find a college graduate who's willing to get his hands dirty. The guy we want didn't finish college and knows he has to work a little harder to keep up with his classmates who got their sheepskins." ["Danner Feasts on Food Franchising " Business Week, no. 2199 (October 23, 1971), 120.]

L. Experience

Relying on experience as an indicator of whether an individual possesses certain skills is a dangerous, but necessary, part of the selection process. This is especially true when selecting Should Cost team members, for the proven ability to perform complex engineering or accounting tasks is a definite asset. The real hang-up in evaluating experience comes when we try to substitute experience for education.

Experience is important for it combines background, training, and practice; and sound judgment calls for all three. But when reviewing experience, we must be careful to distinguish between real experience and seniority, for what seems to be similar experience on a sheet of paper may have benefited two individuals differently. Five years of experience may represent a steady accession of new and valuable abilities and talents for one individual, but for another, it may be merely the equivalent of one year of skills repeated five times.

When training and experience are evaluated solely on the basis of a few statements in a resume or employment form, it completely omits the qualitative aspects of the evaluation. Qualitative data often can be obtained either by contacting previous supervisors or by questioning the applicant. Relying on employers may be hazardous for, in essence, one may be transforming the employer into an examiner whose attitudes and capacities are unknown.

Powell in Personnel Administration in Government notes that while

Widely used in industry, the practice of collecting qualitative information from former employers may have doubtful value in public

service. . . because of the questionable validity of ratings thus obtained. . . . Emphasis must be put on the apparent nature of the usefulness of the [unassembled] training and experience test. Research on the point is almost nonexistent and not especially comforting to the test analyst. In one investigation with arresting results, thirteen trade jobs and three professional jobs were studied. When experience and training ratings were correlated with later supervisory evaluations of job performance, the results exhibited no significant relationship. So varied are work situations and so correlated is job performance with the particular characteristics of particular job contexts (the nature of the boss, colleagues, traditions of the agency, and so forth) that it seems a plausible thesis to consider specific training and experience to be frequently overvalued, especially in lower level positions. On the other hand, experience may itself be regarded as a test of ability to learn if - and the 'if' must be stressed - there is opportunity to appraise qualitative aspects of the work experience.⁷⁰

Placing minimum requirements on experience either by specifying a certain number of years of industrial experience or by specifying a certain number of years at a certain grade level may have an adverse effect of tossing aside the enthusiastic and educated younger employee who can perform admirably. Also, when considering employees who have had many years of industrial experience for participation on Should Cost teams, one might be concerned with their reason for having sought Government employment in the first place. An employee with 20 years industrial experience who entered into Government employment at the GS-9 or GS-11 level, may have been "burned out" when he was hired, and consequently has less capability than an individual with only five years of industrial experience, or even none at all, who has been rising fast through Government service.

⁷⁰ Norman John Powell, Personnel Administration in Government (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1956), pp. 262-264.

In short, if you get too particular in specifying experience requirements by emphasizing the quantity aspects, e.g., x years of experience, and not the qualitative aspects, you may load the selection situation to produce no better than the best of a poor lot.

In an article previously mentioned in the section on education, Dalton and Thompson report on the "accelerating obsolescence of older engineers." They note the often quoted statement that "an engineer's education has a half-life of ten years, that is, half of what he learns in college becomes obsolete in ten years." While this statement may apply more to engineers who are working in a design and development context, Dalton and Thompson note that

Our study suggests that psychological changes during an engineer's career are more significant than are physical ones. We have seen, for example, repeated instances of what we call the negative spiral: when a man gets a lower evaluation rating, or is left a long time on a dull assignment, or is passed over for promotion, at first he puts in greater effort, usually without prompt positive results; then he develops a stubborn 'what the heck' attitude; then comes a lower rating, lower self-confidence, and a still lower rating, and so on. An older engineer often views the future with pessimism. He expects little positive reward, even if he does put forth greater effort. . . . we have often been asked whether the same kind of age/performance curve is found outside the field of engineering. Our answer is that we do not know yet, but preliminary evidence suggests that this may indeed be the case."⁷¹

M. Age

In the survey of literature, very few comments were found which would indicate that one should specify any age bracket as a criterion for selection. This is no doubt caused by federal laws which prohibit discrimination on the basis of age. However, one must recognize that as one gets older he has

⁷¹ Dalton and Thompson, op. cit., pp. 63 & 67.

less physical energy available and, in the context of a Should Cost study, the pressures therein may create some physical stress. While there is no intention of recommending a certain age limit for Should Cost team members it should be noted that specifying a minimum educational level such as a college degree may serve to have younger personnel on Should Cost teams. Table II shows the degree level by age, of civilian scientific and engineering personnel within the Army. The real jump in the percentage of non-degreed personnel occurs in the 45-49 age bracket and increases considerably in the older age brackets. Table III shows the average age and grade for personnel serving on Should Cost teams. While this is admittedly a small sample (100 people), those with college degrees, on the average, tended to be equal in grade to those without college degrees, but were five years younger.

N. Applicability of Organization Development Concepts

Organization development is the use of group dynamics and related social psychology techniques to assist an organization in examining its technical systems and social relationships problems so as to develop better solutions. It is designed to assist members of an organization in diagnosing their own problems and developing their own solutions.⁷² It is generally a long-term program of planned change designed to move an organization from one level of effectiveness to a higher level of effectiveness and then to stabilize it at the new level. The program may or may not utilize an external consultant and may or may not use a particular management style model to effect the changes.

⁷² Moore, op. cit., p. 1-66.

TABLE II
DEGREE LEVEL BY AGE OF CIVILIAN SCIENTISTS AND ENGINEERS EMPLOYED BY U.S. ARMY

	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+	Total
No degree	0.3	1.8	1.9	2.8	4.0	10.8	17.9	23.0	23.2	7.6
Bachelor's	94.1	77.7	73.2	69.3	65.9	60.7	56.3	52.5	44.9	67.0
Master's	5.6	16.3	16.8	18.4	19.4	20.1	17.3	15.3	15.4	17.1
Doctorate *	-	4.1	8.2	9.4	10.7	8.4	8.5	9.1	16.4	8.3

* Includes M.D., D.D.S. and D.V.M. degrees

Source: E.M. Glass, "Civilian Scientists and Engineers in Army, Navy and Air Force RDT&E," Management Analysis Report 69-5, (Office for Laboratory Management, Office of the Defense Research and Engineering, Washington, D.C., September, 1969), 5.

TABLE III

AVERAGE AGE AND GRADE OF FULL-TIME, NON-CLERICAL AMC CIVILIAN PERSONNEL SERVING ON AMC SHOULD COST TEAMS

	Engineering	Procurement (incl Price Analysts)	Other (incl Ind. Spec.)	All Specialties
Less than Bachelor's degree				
Number of persons	1	18	8	27
Average age	-	52	48	50
Average grade	-	12.5	11.5	12.3
Bachelor's degree and higher				
Number of persons	44	23	6	73
Average age	45	46	40	45
Average grade	12.8	13.0	11.1	12.7

Some of the organization development models were reviewed to see if they would be of any benefit in the personnel selection phase. Among those considered were the "Management Grid" concept which assesses an organization's concern for people versus its concern for production, and Reddin's "3-D Theory" which characterizes managers as to their task orientation, relationships orientation, and effectiveness.

The applicability of these concepts to personnel selection, while not totally inconsistent with their objective - which is to assess management styles for the purpose of achieving improvements in organizational accomplishments - would be a rather strained adaptation and it is felt that literature dealing directly with personnel assessment procedures offers sufficient guidance for developing selection procedures.

CHAPTER III

RELATING PERSONAL CHARACTERISTICS TO EMPLOYEE CAREER APPRAISALS

In the survey of literature presented in Chapter II, it was stressed that some method of identifying differences in the level of performance of individuals is necessary to identify the factors which differentiate between "successful" and "unsuccessful" employees. This is a prerequisite if it is desired to hire applicants whose characteristics match those of the "successful" employees. An underlying assumption is that there is a causal pattern between the identified characteristics and "successful" performance.

This chapter will present a profile of potential Should Cost personnel within AMC, and assess the validity of available appraisal data and its relationship to personal characteristics of Should Cost team members.

A. Profile of Potential Should Cost Personnel Within AMC.

Tables IV and V show the number of people at each AMC Commodity Command who are classified as engineers (general, mechanical, electronic, aerospace, industrial and other), procurement personnel, price analysts and industrial specialists. [Persons in these categories, along with auditors provided by the Defense Contract Audit Agency, fulfill most of the functional specialties that might normally be desired on a Should Cost team, with some industrial engineers and price analysts always required. The position of "management analyst" is also common to Should Cost teams. However, there is no job specialty within AMC that conforms automatically to the function of a management analyst as required on a Should Cost team and oftentimes personnel in the job areas cited above, with a background in business administration/management, perform this function.] Table IV is for grades GS-12 through GS-15, Table V is for all grades.

TABLE IV

DISTRIBUTION OF AMC PERSONNEL, BY FUNCTIONAL CLASSIFICATION
AND COMMODITY COMMAND, GS-12 THROUGH GS-15, 1971 DATA

	AVSCOM	ECOM	MECOM	MICOM	MUCOM	TACOM	WECOM	TOTAL
General Engineering, GS-801	19	125	27	658	414	50	57	1350
Mechanical Engineering, GS-830	13	87	16	99	733	304	275	1527
Electronic Engineering, GS-855	15	1060	0	282	197	11	17	1582
Aerospace Engineering, GS-861	188	0	0	196	40	0	0	424
Industrial Engineering, GS-896	16	1	4	35	189	29	78	352
Other (Materials, Automotive, Electrical, Chemical and Metallurgical)	15	30	3	48	305	130	12	543
TOTAL	266	1303	50	1318	1878	524	439	5778
Procurement Personnel (Including Price Analysts)	89	70	53	182	211	172	194	971
Price Analysts								
Data Not Available								
Industrial Specialists	14	47	14	47	130	38	26	316

TABLE V

DISTRIBUTION OF AMC PERSONNEL, BY FUNCTIONAL CLASSIFICATION
AND COMMODITY COMMAND, ALL GRADES, 1971 DATA

	AVSCOM	ECOM	MECOM	MICOM	MUCOM	TACOM	WECOM	TOTAL
General Engineering, GS-801	28	136	29	676	549	63	88	1569
Mechanical Engineering, GS-830	20	108	19	116	1093	349	395	2100
Electronic Engineering, GS-855	16	1232	0	304	307	13	27	1899
Aerospace Engineering, GS-861	273	2	0	206	52	0	2	535
Industrial Engineering, GS-896	26	3	5	46	312	36	99	527
Other (Materials, Automotive, Electrical, Chemical and Metallurgical)	15	33	8	57	451	138	31	733
TOTAL	378	1514	61	1405	2764	599	642	7363
Procurement Personnel (Including Price Analysts)	335	181	180	423	477	371	496	2463
Price Analysts (1970 Data)	19	47	14	32	35	19	17	183
Industrial Specialists	23	106	39	59	269	84	37	617

A review of data on age and educational levels for the populations identified in Tables IV and V provides the following observations:

1. Eighty-four percent of the 7,400 engineers at AMC Commodity Commands possess an undergraduate degree, while less than one-third of the 2,500 personnel in procurement and price analysis are college graduates. Only 13 percent of the 617 industrial specialists are college graduates.

2. Numerically, engineers in the grades of GS-11 and below represent a much smaller group than engineers in the grades of GS-12 and above. For procurement personnel and industrial specialists, there are about as many GS-11's as GS-12's.

3. Price analysts are included in the 1102 job series with procurement personnel, and our main data base does not provide information on price analysts as a separate group. However, an "AMC Price Analysis Profile" released in early 1970 disclosed that 135 of the 183 price analysts at the commodity commands, at all grade levels, have college degrees. Throughout AMC, about 65 percent of the price analysts are GS-12 or above.

4. Not quite as scarce as price analysts are industrial engineers. While many may be classified as general engineers, there are only 527 persons at the commodity commands in the industrial engineering series (896), of whom 352 are GS-12 or higher. About 83 percent of all industrial engineers, and 89 percent of those GS-12 and above, are college graduates. Over 75 percent of the industrial engineers are located at two commands, MUCOM and WECOM. None of the other five commands has over thirty-five employees, at the GS-12 level and above, in the 896 series, and there are two commands, ECOM and MECOM, with less than five each.

5. Average age data is difficult to summarize because it varies between grade levels, between commands, and within the engineering field, between disciplines. However, it is important to get a general idea of the age stratification of the people most likely to serve on Should Cost teams, since it offers some indication of the flexibility and mobility of the population and, consequently, their willingness and desire to participate in Should Cost studies.

For engineers, GS-12 and above, their average age is in the mid-forties. GS-11 engineers tend to be three to five years younger. The average age for the approximately 1,000 people in procurement and price analysis, GS-12's and above, is about 50. About 14 percent are under 40 years of age. At no command is their average age below 47, and at three commands, it exceeds 50. For industrial specialists, the average age for GS-12's and above is about the same, however, only seven percent are under 40. The average age for GS-11's in procurement, price analysis and industrial specialist fields is only one to two years lower than the average ages cited above.

B. Employee Career Appraisals for AMC Civilian Personnel in Procurement and Engineering.

Civilian employees in the Department of Defense receive a career appraisal annually. It is prepared by the supervisor on DD Form 1559, Employee Career Appraisal, and requires review by the next higher level supervisor and by the employee. Section 1, which is illustrated in Figure 2, provides for a quantitative evaluation. The employee receives a rating in each of seven categories: technical competence, quantity and timeliness, written communications, oral communications, cooperation, stability,

FIGURE 2

EMPLOYEE CAREER APPRAISAL																			
CONTROL NUMBER						DATE OF BIRTH						DATE OF APPRAISAL						INSTRUCTIONS FOR COMPLETION Do not complete Control Number (Col. 1 - 6). Complete Date of Birth and Date of Appraisal (Cols. 7 - 18). Use numbers.	
DAY		MONTH		YEAR		DAY		MONTH		YEAR		DAY		MONTH		YEAR			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
NAME (Last, First, Middle Initial)												SOCIAL SEC NO.			DOD COMPONENT			CAREER FIELD CODE	
POSITION TITLE, CSC SERIES AND GRADE																			
NAME AND LOCATION OF EMPLOYING ACTIVITY																			
CAREER FIELD																			
SECTION I - CAREER APPRAISAL																			
THIS SECTION IS TO BE USED TO APPRAISE THE EMPLOYEE'S POTENTIAL CAPABILITY AS JUDGED AGAINST ESTABLISHED CHARACTERISTICS AND SKILL REQUIREMENTS FOR PROGRESSION IN THE CAREER FIELD.																			
CARD COLUMN	APPRAISAL ELEMENTS												CODE LEVEL	• NUMERIC CODE LEVELS: 4. Outstanding 1. Marginal 3. Above average 0. Unsatisfactory 2. Average					
	ENTER CODE WHICH MOST NEARLY DESCRIBES THE EMPLOYEE'S POTENTIAL CAPABILITY. PARTICULAR CONSIDERATION WILL BE GIVEN TO THOSE COMPONENTS FOLLOWING EACH ELEMENT IN PARENTHESES.													IDENTIFY SKILLS AND CHARACTERISTICS ESTABLISHED AS REQUIREMENTS, AND UPON WHICH DETERMINATION OF CODE LEVEL IS BASED.					
	1. TECHNICAL COMPETENCE (Soundness of decisions, solutions and recommendations, quality of work produced.)																		
20	2. QUANTITY AND TIMELINESS (Meeting of schedules and deadlines accomplishing of workload in order of priority.)																		
21	3. WRITTEN COMMUNICATION (Expression of ideas in a clear, precise and convincing manner.)																		
22	4. ORAL COMMUNICATION (Expression of ideas in a clear concise and convincing manner. Consider both face-to-face and conference situations.)																		
23	5. COOPERATION (Exercising tact and diplomacy and maintaining effective relationships, working harmoniously with others, considering other view points and being willing to give assistance.)																		
24	6. STABILITY (Maintaining composure and effectiveness under pressure and adverse and changing conditions.)																		
	7. SUPERVISION AND ADMINISTRATION (Development of employees, respect, loyalty and cooperation gained, effectiveness of delegation of authority, distribution of work, coordination and control of diversified activities, assuring conformance to high standards, planning and organization.)																		
30													S						

and supervision and administration. The numerical ratings which may be assigned are 4-outstanding, 3-above average, 2-average, 1-marginal, and 0-unsatisfactory. The form also provides for a narrative comment by the supervisor.

Tabular information for employees at Hqs., AMC and the seven commodity commands was obtained for those personnel claiming experience in the categories of "central procurement and contracting," "industrial specialist," "procurement-related staff activities," and the various fields of engineering. These data contained the following information, in numerical summary, for all employees, by specific experience code and by command as of January 1971:

1. Average career appraisal rating by grade.
2. Age, in five-year intervals, versus grade, and average age of all employees in each grade.
3. Educational level attained versus grade.⁷³

At first glance, command-wide averages of appraisal ratings would seem of little value since, in some cases, there are several hundred employees' ratings included in the average, whereas this study is concerned with identifying personal characteristics associated with an individual's success or failure on the job. However, evaluation of this data did disclose some useful information.

For example, at one commodity command, where there were 85 individuals with procurement and pricing experience, GS-12 and above, all 85 received

⁷³ While the information on age and educational level was of some value, data showing age versus educational level, by grade for each experience code at each command, would have been more useful, for sound personnel selection policies cannot consider age, educational level and grade as variables independent of each other. Unfortunately, such data was not readily available.

an "outstanding" rating in each of the seven appraisal categories. In other words, where a 4.0 average is the highest attainable for an individual, none had less than a 4.0 average. Although the possibility exists that this command has only "outstanding" procurement personnel, it is not likely; what is more likely is that the raters are extremely lenient.

The situation at the other commands is not much better. There, the averages go as low as 3.7 for contract specialists and price analysts, GS-12 and above. The average for all contract specialists and price analysts at all seven commodity commands is 3.8. Hence, any individual receiving five "4's" ("outstanding") and two "3's" ("above average"), is really below average.

A review of the average ratings for the engineering specialties which predominate at the commodity commands was also made. Fifteen groups were identified as containing 100 or more engineers: aerospace engineering at AVSCOM and MICOM, chemical engineering at MUCOM, electronic engineering and general engineering at ECOM, MICOM, and MUCOM, industrial engineering at MUCOM and WECOM, and mechanical engineering at MICOM, MUCOM, TACOM, and WECOM. These groups contain over 85 percent of the 7,400 engineers located at the commodity commands. The average rating for engineers, GS-12 and above, in these categories is approximately 3.7; only two of the fifteen groups have average ratings less than 3.6.

This clustering of the rating averages about the upper limit may be attributed to a bias described usually as "leniency error" - the awarding of a higher evaluation in one or more traits than the employee actually deserves.

The presence of this bias, plus the facts that raters within the Government have had little or no training and there is no assurance that there is any degree of objectivity among the raters must cause one to discount the validity of annual performance ratings. And if one does not have valid appraisals, there can be no statistical basis for drawing inferences about those personal characteristics which go "hand-in-hand" with "successful" performance.

C. Establishing Performance Predictors for Should Cost Personnel.

It was intended to relate an individual's annual career appraisal and biographical data to his performance on a Should Cost team. Specific factors that were to be considered for correlation with Should Cost performance included age, education, recency of education, annual employee career appraisal ratings, industrial experience, years of Government service, Civil Service grade and time in grade, and age at the time of the individual's last entry into civil service.

An evaluation of the effectiveness of each individual serving on a Should Cost team was requested from past team chiefs by Hqs, AMC.⁷⁴ The information provided by those team chiefs that furnished written evaluations was supplemented with the results of informal inquiries made during interviews with team leaders of the first eleven AMC Should Cost teams. Some of the written evaluations appear to be influenced by the "leniency error." On several studies, team chiefs gave everybody a laudatory rating, even though in some instances, individuals had performed below expectations.

⁷⁴ AMC Regulation 715-92, "Should Cost Analysis" specifies that "within 30 days after completion of a Should Cost study, the team chief will prepare an evaluation of the effectiveness of each member, including the deputy team chief, and forward the evaluations in duplicate to the Commanding General, ATTN: AMCRP-SC."

(This bias appeared to occur only where the team leader and the team members were all from the same commodity command. Where the team leader was from outside the command performing the study, his appraisals were not uniform in praise; however, it is recognized that the presence of critical comments does not, by itself, indicate objectivity, rather, it merely indicates the absence of a wide-scale "leniency" error.)

The reason for an "in-house" team leader being lenient in his appraisal is probably attributable to one of two reasons. Either he fears the evaluation will be shown to the employee and might alienate the employee if it is the least bit critical, or he desires to guard against information which will reflect adversely on himself and therefore will not admit to having made a "bad pick." In either case, his response is "Everyone I selected was outstanding or I would not have selected him in the first place."

Although invalid performance data places severe limits on the identification of behavioral factors that appear to discriminate between "good" performance and "bad" performance, some analysis was attempted.

Table VI indicates, using as a base, over 100 non-clerical, AMC civilian employees who have served full-time on Should Cost teams, that their annual career appraisals are either at, or approaching, the upper limit, of 4.0. Thirty individuals received all "4.0's" in their last appraisal rating, 32 have shown improvements in their appraisals, 12 remained constant and 6 declined. In four cases, the ratings showed

TABLE VI

ANNUAL CAREER APPRAISAL RATING PATTERN FOR NON-CLERICAL, AMC CIVILIAN
EMPLOYEES WHO HAVE SERVED ON AMC SHOULD COST TEAMS

	Three Years' Appraisals	Two Years' Appraisals	One Year's Appraisals	No Appraisals
4.0 rating on each appraisal	18	1	6	n.a.
Latest appraisal rating is 4.0	3	2	n.a.	n.a.
Appraisal rating rising	26	6	n.a.	n.a.
Appraisal rating constant	5	7	n.a.	n.a.
Appraisal rating declining	4	2	n.a.	n.a.
No trend apparent	4	n.a.	n.a.	n.a.
Insufficient data	n.a.	n.a.	10	8

n=102

no pattern and in 18 cases there was insufficient data. Although this is admittedly a small sample, it does not present any contradiction to the apparent existence of the "leniency error."

The narrative comments entered by a supervisor on the "Employee Career Appraisal" form are completely worthless as far as giving any indication to the employee's capability. They are strictly qualitative in content, always praiseworthy, and usually contain a statement that the employee is well-qualified for promotion.

No conclusions appear appropriate, based on the limited data base, regarding specific educational level or type of previous work experience as indicators of effectiveness.

The employees under study were classified as to whether they had received an outstanding performance award, sustained superior performance award, quality step increase, or comparable award. Certificates of achievement, letters of appreciation and similar commendations were excluded. Those who received such awards more than four years ago were evaluated separately to determine the effects of recency of long-term high performance ability. The same evaluation was also performed using a cut-off point of six years ago (1966). The results are presented in Table VII. One relationship that is apparent is that those who receive awards for above average performance of a long duration are more likely to receive all "4's" in the career appraisal. Also, they tend to be at least one grade higher than the non-recipients. Length of time since the last recognition does not seem to affect current ratings to

TABLE VII

MAJOR AWARDS RECEIVED IN CIVIL SERVICE BY NON-CLERICAL,
AMC CIVILIAN EMPLOYEES WHO HAVE SERVED ON AMC SHOULD COST TEAMS

	Number of Persons	Average Grade	Latest Annual Average Performance Appraisal Rating	Percentage of Persons with "4.0" Average in Last Career Appraisal Rating
Received latest recognition in 1968 or later	23	13.4	3.9	70%
Received latest recognition in 1967 or earlier	13	13.2	3.8	46%
None received	56	12.3	3.5	14%
Received latest recognition in 1966 or later	27	13.3	3.9	63%
Received latest recognition in 1965 or earlier	9	13.4	3.8	56%

any degree. One area of question is whether these awards are a function of outstanding performance or a function of grade. If the awards are actually a function of both, it is probably more dependent upon the former, especially if grade is considered as also being a function of continued outstanding performance.

An analysis of each employee's most recent annual career appraisal ratings revealed that only thirteen individuals had received a "2" (average) in one or more of the seven appraisal elements. None received less than a "2." All are GS-12 or lower, even though GS-13's and above constituted 45 percent of the base. Included among these thirteen were at least six individuals whose performance on a Should Cost team is considered to have been marginal, at best. A reasonable conclusion is that individuals with one or more "2's," or lower scores, in their last annual career appraisal should not be considered for a Should Cost team.

In an attempt to identify the better performers on Should Cost teams, biographical data was evaluated on the "repeaters," that is, on those who have served on more than one Should Cost team. This approach assumes that such individuals are selected again because of their previous good performance on a Should Cost study; in some cases, it appears they were selected because of their previous exposure to Should Cost, regardless of their effectiveness. Thirteen "repeaters" were identified and biographical factors were evaluated to determine common characteristics. Factors which were evaluated included grade, time-in-grade, age, education,

industrial experience, major awards received, and latest performance appraisal rating. Three areas offered interesting results: the age of repeaters tended to not exceed 50, only three had received major awards, and only three had any industrial experience in the past twelve years. No patterns were evident for the other categories.

D. Military Personnel

Thus far, this study has assumed that team members will be Civil Service employees. This has been done for ease of treating the overall subject of personnel selection, but it is highly likely that a Should Cost team will have one or more Army officers. (Of the eighteen AMC Should Cost teams assembled to date, sixteen have had full-time military participation.)

In several respects, the problem of identifying talented military personnel in a formal manner can be more difficult. Primarily, this is because of the virtual inaccessibility of past performance appraisals. Even if these were readily available for review, it is doubtful that they would be of much value because the appraisals would represent ratings for jobs far removed from the Should Cost arena, and thus bear little relevance to one's potential performance on a Should Cost team.

Other difficulties in evaluating the talents of military personnel include the fact that their collegiate education is less likely to be related to their dominant occupational speciality than is true for their civilian counterparts; their experience may not be oriented towards an industrial environment; and the experience that does bear relevance to a Should Cost analysis is likely to have been obtained in fragmented

assignments rather than in a continual maturing process. This last point is due to the Army's desire that its officers be generalists, and thus have a variety of assignments, rather than specialists. Consequently, an officer's experience may include several discrete assignments that are far removed from the experience that would be useful on a Should Cost team.

On the positive side, the motivation of officers, especially career officers, may be greater than for Civil Service employees, because their "Officer Efficiency Reports" (performance appraisals) serve as the basis for promotions. It is not likely that an officer would perform below par, on purpose, while serving on a Should Cost team.

Sub-par performance, if it were to occur among the "career-military" members of Should Cost teams, and it has not yet, would probably be attributable to limitations in experience or education rather than to motivational problems.

The educational evaluation of an officer should include a review of schooling obtained in the service which might bear some relevance to Should Cost. Of special interest should be officers who have recently obtained advanced degrees in engineering, engineering administration, or business administration.

In particular, looking at the staffing of a Should Cost team below the team chief/deputy team chief level, field-grade officers have served well in the position of operations officer, and company grade officers have served well in the positions of administrative officer and management analyst. In the latter case, particularly appropriate are those young

officers, whether career or non-career oriented, who possess an undergraduate degree in an engineering field, especially industrial engineering, and possibly a graduate degree in business administration; their positive attitude and aggressiveness can more than compensate for their lack of a significant amount of on-the-job experience.

CHAPTER IV

THE STAFFING OF SHOULD COST TEAMS

Interviews were conducted with individuals who were either involved, or should have been, in selecting members for the first eleven AMC Should Cost teams and one non-AMC team. Those who "should have been" refers to team chiefs who had little or no voice in the selection of team members, primarily because of time constraints. Specifically, interviews were conducted with five team chiefs, three deputy team chiefs and three operations officers. The questionnaire contained in the Appendix was used to assure comparability of comments. On the five Should Cost analyses for which "Lessons Learned" have been prepared, those comments regarding the selection process were also considered.

The purpose of interviewing team leaders and reviewing the "lessons learned" was to analyze the selection procedures employed to determine what improvements, if any, can be made to improve the selection process.

Also, the Should Cost Coordinator at a DOD activity not under Hqs AMC was interviewed, using the questionnaire format, to obtain information about the selection procedures used in preparing for that activity's first Should Cost analysis. Since their selection process was much more systematic in nature than the selection process for any of the AMC Should Cost analyses, it will be discussed in detail in a separate section.

The significance of interviewing personnel associated with the selection process on previous Should Cost analyses is highlighted by the statement

of one team leader, who said: "No more than half of the total team membership can be said to have been demonstrably effective. In other words, with the knowledge of the individual team members gained through the course of the study, a team half its original size could now be formed from the same group with little likelihood of experiencing any appreciable loss in productive capabilities."⁷⁵

A. Selection of Team Members

An APRO study on team size and structure noted that the size and mix of a team must be tailored to the magnitude and complexity of the problem. It concluded that the "advance team" best allows this condition to be met.⁷⁶ The underlying rationale is that an advance or "scout" team, consisting of the team chief, deputy team chief, operations officer, administrative officer and sub-team chiefs, having physically reviewed the contractor's operations and been briefed by contractor management personnel and cognizant Government contract administration personnel, is able to logically identify areas for investigation that offer the most payoff potential, develop a study plan including milestones, and establish resource requirements, i.e., team size and skill mix. However, in practice, this approach has been the exception rather than the rule.

The selection processes employed to date for staffing Should Cost teams have, for the most part, been characterized by a lack of planning and order. Lack of time has been a major constraint and there are few

⁷⁵Anonymity was assured those who were interviewed in exchange for their candor.

⁷⁶Gunther Lange, The Should Cost Team: Size and Composition, (Fort Lee, Va.: U.S. Army Procurement Research Office, February 1971).

indications of team leaders having spent considerable time in reviewing the qualifications of several individuals and then selecting those who appeared to be best qualified. In several cases, including those where the team leader was an "outsider," the team leader was given a "tentative" roster of personnel "selected" for the team by someone in authority at the command with the team leader being allowed to say "yea" or "nay." In some instances, the team leader did not meet these individuals until the first time the team assembled as a group, so that he had little chance to reject any of the team members since securing replacements would consume additional valuable time. In these cases, the team leader vetoed a nominee only when the individual's inability to be effective was obvious.

Where the team leader actively participated in the selection process, he usually had personal knowledge of the prospects or had received recommendations from persons whose judgment he trusted. The main, and often only other, selection device used was the interview. In only a few cases was there any evidence that a "referral list" or "roster of available personnel" was used. One team leader who attempted to rely on a "referral list" wound up receiving substitutes in lieu of his "first choices."

Only a few team leaders reviewed in any detail the resumes of persons they were considering; this is especially true where the individual was selected based on personal knowledge. Nor is there any indication that supervisors were contacted for information about the performance of their employees, to any significant degree, other than to obtain approval for the employee to serve on the team.

B. Qualifications Sought

Technical expertise was the qualification sought most. Team leaders generally mentioned the following as desirable qualifications for the working members of the team:

Technical expertise, i.e., being highly qualified in one's field. Experience with industry is highly desirable. For engineers, knowledge of production methods and manufacturing processes is a "must." In this respect, several industrial engineers, by title, and/or manufacturing engineers, by experience, are required. The other speciality that is most in demand (other than auditors, who are supplied by the Defense Contract Audit Agency) are price analysts. Also desirable are persons who can perform as management analysts and one or two individuals who are familiar with the plant at which the analysis is being performed and/or with the product involved.

Ability to converse intelligently with persons upon meeting them for the first time.

Agreeable personality - avoid selecting persons with a harsh personality or individuals who "come on too strong." Individuals must seem compatible with potential co-workers.

Willingness to serve, motivation and dedication to the task.

Ability to work alone, think logically, and take directions so that one does not "divert without telling the boss, but neither does he exercise 'blind obedience'."

Neither education nor writing ability were stressed. In many cases, though, the need for an adequate level of education is often thought of as being indicated in the job title representing the specific skill sought; this is especially true in the case of engineering specialties. On the other hand, writing ability, especially for engineers, is desirable but not normally expected and a team leader who stresses writing ability too much in the selection process may have to pass over some exceptionally well-qualified technical personnel. (Consequently, some team chiefs advocate the use of a technical writer/editor for the report-writing phase.)

For sub-team chiefs, supervisory ability is considered a "must" as well as sufficient technical expertise to be able to insure that the sub-team's findings are reported in an understandable fashion and so he can effectively defend the findings during negotiations.

There did not appear to be any instances where the team leader had actually defined the qualifications beforehand or had applied any sort of merit rating or quantitative approach in selecting team members. The best that can be said is that qualifications were only considered in a qualitative manner.

C. Acceptability of Individuals Selected

Nine of the approximately 150 persons who have served on the eleven AMC Should Cost teams included in this study were "sent home" during the in-plant analysis phase because of marginal or sub-marginal performance. In every case, the team chief responsible for sending the person "home" was not from the commodity command performing the study. The three team

leaders interviewed who were "outsiders" also indicated there were others who should have been sent home but were not, primarily because by the time it was recognized that they were unsatisfactory, it was too late to obtain and train replacements who would be effective. Only two of those team leaders who came from the commands which performed the studies admitted that they had selected any individuals who did not perform satisfactorily.

Of the nine persons sent home, eight were AMC employees and one was from a non-Army activity. Reasons for dismissal included being unsuited for the task, refusal to devote sufficient time to the analysis, nervous tension, and alcoholism.

D. Satisfaction with the Selection Process

Analysis of the comments obtained in the interviews disclosed one underlying pattern: the eight team leaders interviewed who were from the procuring activity performing the study were satisfied with the selection process and the three team leaders interviewed who were not from the procuring activity performing the study were not satisfied with the selection process. It is a moot point as to whether this is because team leaders from the command generally knew many of the team members beforehand or knew supervisors and co-workers of these persons and thus were able to select better qualified groups than those team leaders from outside the command, or because team leaders from the command are unable to be objective in appraising co-workers. It is probably a little bit of both, but if team leaders from the command performing the study are able to consistently pick personnel from that command, who perform substantially better than personnel

who are "selected" by an outsider, then, assuming that it is reflected in the success of the study, this must be considered in judging the merits of having the team chief come from the command performing the study. But before those who advocate that all team chiefs be selected from the commands performing the studies start citing the above as additional support for their point of view, it is necessary that we have a few instances where "outside" team leaders have had the time and capability to perform the selection process in a systematic, orderly manner.

E. Methodology Employed by a Non-AMC Activity in Selecting Personnel to Perform a Should Cost Analysis

The selection process employed by a non-AMC activity in staffing its first Should Cost team is presented because it illustrates a more orderly and systematic procedure than currently exists in the staffing of AMC Should Cost teams.

Immediately after the procuring activity decided to conduct a Should Cost analysis, the command's "Should Cost Coordinator" was given the responsibility for staffing the team. The Coordinator started approximately three months before the in-plant analysis began and completed the staffing of the team in about two months.

The Coordinator proceeded by first determining what the skill needs of the team were likely to be. He then identified the job series and experience codes that contained these skills and obtained data printouts from the Service's talent bank for everybody who had had experience in these "skill needs" within the past ten years. These printouts, which are essentially resumes, were then reviewed to identify potential candidates. The

Coordinator concentrated primarily on GS-13's and above, concerning himself chiefly with (1) the nature of the individual's experience, giving special attention to those with experience in industry, (2) the performance ratings and supervisor's comments contained on the printout, to obtain a rough measure of the individual's performance, and (3) apparent physical stamina, as evidenced by one's age. In some cases, he would contact the candidate's supervisor, to obtain additional information on the employee's capabilities, avoiding any mention of the specific purpose for the inquiry. This was because he fast learned that if he told a supervisor an individual was being considered for a Should Cost study, the supervisor would quickly tell him that the employee was not available and should be dropped from consideration.

For each position on the team, the Coordinator narrowed the number of candidates to five or six. These candidates were mostly from the procuring activity that was going to conduct the study, but there were some individuals from other procuring activities within the Service. The Coordinator then inquired of each individual as to his interest in participating in the Should Cost study. During the inquiry, the Coordinator also sought to obtain any additional information which was needed to better evaluate the individual's background.

At this time, the Coordinator was then able to narrow the list to two or three willing and seemingly well-qualified candidates for each position. The Coordinator then made the final selections, based on interviews conducted either in person or via telephone.

While this might be thought of as completing the selection process, actually it was just the beginning, for it was then necessary to contact the supervisor of each individual selected to secure permission for that individual's participation on the Should Cost team. In many cases, the supervisors objected to some degree, usually acquiescing after some prodding, but in a couple of instances adamantly refusing to loan a subordinate to the Should Cost team.

The Coordinator feels that a certain amount of disagreement by supervisors serves as an indicator that the selection process is working well; he reasons that if the supervisor says that the employee is needed on his regular job to such an extent that he cannot be detailed for any length of time, then, in all likelihood, one has identified a highly capable individual. In a few instances, the Coordinator was forced to either secure an alternate, usually his second or third best candidate, or even accept a substitute of someone else's choosing.

While the Coordinator was generally satisfied with his approach to the selection process and does not plan to alter it the next time he selects team members, he believes that two improvements are necessary; first and foremost, he desires "command backing" so that when an individual has been identified for the team, the Coordinator will not have to battle supervisors "tooth-and-nail" to obtain the employee. Such "command backing" should also lessen the time required for selecting team members, since much time was spent in trying to get those individuals whom he had identified as being "top choices," and in securing alternates, when the "top choice"

was not available. Secondly, he will attempt to conduct a personal interview on every individual being considered in the final phase of the selection process.

The Coordinator stated that two members of the team were "sent home" because of unsatisfactory performance; one was an individual who had been selected based on the advice of an associate, but had not been interviewed, while the other was a "substitute" who was "nowhere near being a first choice." Additionally, the Coordinator felt there was one more individual that should have been relieved.

Other comments of the Coordinator were that, on subsequent teams, it is his intent that leaders and sub-team leaders will be required to have had previous Should Cost experience, that the selection process should be started as early as possible, and that the writing ability of technical personnel, especially engineers, is a definite problem.

F. Qualifications Team Leaders would Seek in Selecting Personnel for a Subsequent Should Cost Analysis and Suggestions for Improving the Selection Process

As expected, most team leaders who were from the commodity commands which conducted the studies saw no need for making any major changes in the qualifications sought in selecting team members.

One individual felt that it was not a question of changing the selection criteria, but rather a question of locating people to fit that criteria (this is precisely the reason for having a rational procedure for identifying and selecting qualified personnel to serve on Should Cost teams), while another felt there should be less emphasis on enumerating qualifications

and more attention given to the nominee's analytical ability and capability to rationally develop conclusions and recommendations that are defensible.

Those most likely to overcome the generally non-systematic approach to selecting team members, if they were given another opportunity, are the ones who feel that the selection procedure used the first time was highly inefficient - namely, the "outside" team leaders.

Suggestions elicited from the team leaders regarding ways to improve the selection process covered a broad range; several suggestions were not fully related to the selection process and, in a few cases, the comments were contradictory. Significant observations received from the team leaders included the following:

1. Staffing the Should Cost team must be the explicit responsibility of a strong team leader. Unless the leader personally selects the team members, a great deal of the authority and leadership inherent in his assignment is lost.

2. Start the selection process far enough in advance of the in-plant analysis to allow for interviewing and screening of prospective team members - allow up to six weeks from start to finish for selecting team members.

3. Identify your needs in advance - even with the exercise of great care in the selection process, however, some misfits are still likely to be chosen. This likelihood, and the likelihood of not identifying some misfits in time for them to be replaced, must be considered in determining team size and skill mix.

4. Have several candidates to choose from for each position.
5. While personal interviews are desirable, be aware of the danger of placing too much value on them - you can get a "snow job" from individuals who either want to or don't want to serve on a Should Cost team. (This is actually the opinion of only one team leader; other team leaders who stressed the importance of interviewing seemed to possibly overvalue its benefits.)
6. Personnel rosters and "201 files" will tell you whether or not an individual should be able to do the job, but they won't tell you if he can.
7. Look for personnel motivated towards Should Cost and dedicated to the Government, with pertinent experience in previous assignments. A sense of urgency and interest in the overall objective of the analysis must be paramount in each individual's mind.
8. Training sessions can be used as an evaluation tool. All proposed candidates for one team participated in a training course presented by the U.S. Army Logistics Management Center. Careful screening of attendees resulted in a team that gave an outstanding performance.
9. Look for dual experiences, if possible, that is, persons with experience in both a primary and a secondary area. Do not select all of the same kind of individuals; try to get some heterogenous background experience to obtain maximum capability.
10. After selecting team members, keep them informed of the status of the study and strive for good communications during the course of

the study. This helps in developing their confidence and initiating their self-starting capability and motivation.

11. The Should Cost team requires industrial engineering talent with broad experience in analyzing labor factors, overhead, manufacturing processes, ratio/delay and production cost estimating.

12. The team must include at least one member that is technically acquainted with the product; preferably he should be the command's technical expert for that product. Consider having a "product assurance specialist" on the team to evaluate quality assurance matters.

13. Selection of sub-team chiefs should be based largely on established leadership qualities. Sub-team chiefs should have previous Should Cost experience. The engineering sub-team chief must have proven supervisory talents, because of the individuality of engineers.

14. Changes in the organization of the team can result in better skill utilization.

15. Recognize that the effect of personnel problems is magnified in the atmosphere of pressure and urgency that is inherent in a Should Cost analysis.

Two comments are in order about the above listing. While it appears to present a more orderly approach than currently exists, this is because it is presented in composite form. If the comments were separated as to "who said what," the look of orderliness would disappear.

Secondly, none of the team leaders explicitly mentioned "demonstrated competency" as a key selection criteria. While it is implied in several of the selection factors mentioned, such as "personal knowledge of the

nominee" and "significant background experience," it deserves consideration as a separate factor. The importance of this characteristic was noted by a Deputy Director of a Procurement and Production Directorate, who has selected Should Cost team chiefs in the past. Specifically, he stated that he looked for evidence of demonstrated performance in not only team chiefs, but also in their subordinates, as evidenced by:

1. ability to manage people, including the ability to plan and organize,
2. product knowledge, and
3. knowledge of new ideas and new techniques.

It is interesting to note the correspondence between these indicators and the three skills which Katz advocates as being the best judges of an administrator's effectiveness, namely, technical skill, human skill and conceptual skill.⁷⁷

⁷⁷ Robert L. Katz, "Skills of an Effective Administrator," Harvard Business Review, XXXIII (January - February, 1955), pp. 9-18.

CHAPTER V

CONCLUSIONS, GUIDELINES, AND RECOMMENDATIONS

A. Conclusions

1. Any attempt to select personnel for a specific assignment in an orderly, rational manner must be preceded by a defining of the position. You cannot place someone in a job that will be suitable for their talent unless you first know the requirements of the job. On the other hand, to establish too rigid a set of qualifications, which few applicants will ever match, will result in a "dream sheet" of little value.

2. The objective of formal personnel selection procedures is to permit the evaluation of candidates based on their resemblance to "currently successful" employees, in terms of characteristics which research has shown to be related to success in the organization.

3. Techniques used to evaluate these distinguishing characteristics must possess both validity and reliability. The applicability of these techniques is contingent upon the ability to differentiate between the "relatively successful" and the "relatively unsuccessful" employees currently on board.

4. The ineffectiveness of a selection process can often be attributed to reliance on information which is not an accurate indication of job performance. In conjunction with this, there is the problem of "selective perception," the natural human characteristic which tends to place too much emphasis on first impressions; this is often caused by a bias on the part of the selector.

5. Chapter II presented a review of the various selection devices that can be used in assessing individual differences, and of the characteristics

normally considered in the selection process that might be relevant in selecting personnel for Should Cost teams. The emphasis in the following summary of the literature review on the negative aspects of these selection devices and criteria is to point out that no single selection device or criteria is wholly satisfactory and each has its shortcomings; consequently, a good selection process must be built around the strong points of several selection devices and characteristics. Selection devices reviewed include the weighted application blank, psychological tests, references, and the interview.

a. The weighted application blank is essentially the quantifying and weighting of personal history information from an application blank or resume to provide a predictive score of the applicant's success in a job. A carefully developed typical behavior inventory can often be the best individual predictor of future job behavior; its relative success compared to other selection devices is attributable to the fact that one of the best predictors of future behavior is past behavior.

b. The use of psychological tests can provoke all sorts of arguments as to their merits and drawbacks. A major problem with using tests is that one often relies on the test results to the exclusion of all other selection devices, thereby relinquishing his managerial decision-making process for the convenience of an automatic scoring device. Personality tests are generally regarded as suitable for vocational counseling purposes, but not for employment purposes. Experts generally agree that most tests should be used only as a last resort, although an exception is skill tests.

c. The value of personal references, i.e., those supplied by the applicant, is generally questionable.

d. The interview, while the mainstay of the selection process, draws the wrath and anger of many experts in the fields of industrial psychology and personnel research, because the little research that there has been to date casts doubt on the validity of the interview as a selection device.

e. In the best selection programs, the interview will be only one of a number of selection methods used. Structured interviews tend to have greater reliability than unstructured (informal) ones; combining the evaluations of several interviewers on a single applicant may serve to reduce the bias of any one interviewer; allowing knowledgeable journeymen to serve as interviewers may result in a better evaluation of technical skills and knowledge; and interviewing several applicants for the same position, on a group basis, may provide valuable insight into their leadership traits and problem-solving abilities.

f. The value of holding a training session, such as the Should Cost Workshop, immediately prior to the in-plant analysis, deserves considerable consideration since it possesses some of the qualities of a skills test while at the same time serves as a means of observing the performance of prospective team members in a form of situational test.

g. Literature on the "characteristics of successful individuals" was reviewed with the conclusion that much of it is useless, being highly opinionated and unvalidated. Rather, emphasis should be placed on demonstrated performance and the possession of technical, human and conceptual skills.

h. Particular characteristics that were considered include performance appraisals, education, experience, and age:

(1) Many times, performance appraisals represent opinions on behavioral qualities that have never been proven necessary for good performance. The definition of success is such a loose concept that supervisors who rate people as to their success are in fact rating many different things.

(2) Studies on the validity and reliability of performance appraisals have shown that there are numerous errors which can creep into the system. There is the "leniency error," the awarding of a higher evaluation in one or more traits than the employee actually deserved; the central tendency problem, where raters evaluate their employees consistently as average; the "halo effect," which is the influence that a rater's general impression of an individual has upon the rating of that individual on specific traits; and the major problem of varying standards between raters.

(3) Specifying a minimum level of education, such as a college degree, is often done because it appears to be indicative of the "ability to think." It is generally concluded that strict adherence to a minimum educational level does not serve as an effective means of identifying the best workers. In fact, it may tend to exclude a large number of individuals who have achieved high degrees of competence in their specific fields through many years of experience. In technical fields, though, a related college degree serves notice that one possesses formal technical knowledge relevant to his specific field of endeavor. An individual who has become proficient in a technical specialty through many years of practical experience would normally not be considered an engineer in the

broad sense of the word, unless he possesses technical knowledge as might reasonably be expected of a graduate engineer.

(4) When training and experience are evaluated solely on the basis of a few statements in a resume or employment form, it completely omits the qualitative aspects of the evaluation. Placing minimum requirements on experience either by specifying a certain number of years in industrial experience or by specifying a certain number of years at a certain grade level may have an adverse effect of tossing aside the enthusiastic and educated younger employee who can perform admirably. If one is too particular in specifying experience requirements by emphasizing the quantity aspects, e.g., x years of experience, and not the qualitative aspects, the selection situation may be loaded to produce no better than the best of a poor lot.

6. Chapter III presented a profile of potential Should Cost personnel within AMC:

a. Industrial engineers and price analysts, the two most commonly desired functional specialties on Should Cost teams are scarce commodities. There are only 183 price analysts, at all grade levels, at the seven AMC commodity commands. About 74 percent have college degrees. There are 352 persons classified as industrial engineers, GS-12 and above, and over 75 percent of them are located at two commodity commands. None of the other commands has over 35 industrial engineers, GS-12 and above, and two commands have less than five each. About 89 percent of the 352 engineers are college graduates.

b. Eighty-four percent of all engineers at the commodity commands are college graduates, but less than 30 percent of the personnel engaged in procurement (excluding price analysts) have bachelor's degrees. Also, only 13 percent of the industrial specialists hold college degrees.

c. The average age for procurement personnel and industrial specialists GS-12 and above, is about 50, while the average age for the various types of engineers, GS-12 and above, tends to be in the mid-forties.

7. Chapter III also assessed the validity of available appraisal data on potential Should Cost personnel within AMC and attempted to relate for persons having Should Cost experience, the individual's biographical data with his performance on a Should Cost team. Unfortunately, both the annual performance appraisals and the team chiefs' evaluations appear influenced by the "leniency error"; consequently, this data base proved very suspect. Since the ability to classify individuals as "relatively successful" and "relatively unsuccessful" is a prerequisite to establishing an effective personnel selection process, the lack of valid performance appraisals is a serious handicap. Some observations from the data were possible, though:

a. Individuals with one or more "2's" or lower scores, in their last annual employee career appraisal should not be considered for a Should Cost team.

b. Awards such as outstanding performance award, sustained superior performance award and quality step increase may be a function of position and grade as well as actual performance.

c. Findings based on the biographical data of individuals who have served on more than one Should Cost team are inconclusive, because of the small number of persons involved.

8. Chapter IV presented information obtained in interviews with the team leaders of the first eleven AMC Should Cost teams and one non-AMC team, regarding the methods used to select team members, and their opinions as to the adequacy of these methods:

a. The selection processes employed to date for staffing AMC Should Cost teams have, for the most part, been characterized by a lack of planning and order. Lack of time has been a major constraint and there are few indications of team leaders having spent considerable time in reviewing the qualifications of several individuals and then selecting those who appeared to be best qualified. Where the team leader actively participated in the selection process, he usually had personal knowledge of the prospects or had received recommendations from persons whose judgment he trusted. The main, and often only other, selection device used was the interview.

b. There did not appear to be any instances where the team leader had actually defined the qualifications beforehand or had applied any sort of merit rating or quantitative approach in selecting team members. The best that can be said is that qualifications were only considered in a qualitative manner.

c. Analysis of the comments obtained in the interviews disclosed one underlying pattern: the eight team leaders interviewed who were from the procuring activity performing the study were satisfied with the

selection process and the three team leaders interviewed who were not from the procuring activity performing the study were not satisfied with the selection process. It is a moot point as to whether this is because team leaders from the command generally knew many of the team members beforehand, or knew supervisors and co-workers of these persons, and thus were able to select a better qualified group than those team leaders from outside the command, or because team leaders from the command are unable to be objective in appraising co-workers.

D. Guidelines for the Selection of Personnel to Perform Should Cost Analyses

All personnel selection devices have their shortcomings and may be inappropriate in specific situations; yet, many persons ignorant of the finer points of personnel selection feel confident in relying on a single device, such as an aptitude test, personality test, interview, or inquiry of present or past supervisor, as the primary basis for a hiring decision. Mandell notes that:

....one of the most common errors in selection is the failure to relate the information obtained from several methods effectively in arriving at the final decision to hire or not to hire. Too often, predilections for or prejudices against particular selection methods, without reference to their validity or to the overall picture of the applicant that has been obtained, result in ignoring the results of all but one favored method.⁷⁸

To assist in identifying and selecting highly qualified personnel to serve on Should Cost teams, the following guidelines have been developed, based on an in-depth analysis of problems that have occurred in the past in staffing Should Cost teams and on a detailed review of the literature

⁷⁸Mandell, Recruiting and Selecting Office Employees, p. 63.

on personnel selection. These guidelines combine, in a practical manner, the more readily available and useful selection devices while, at the same time, pointing out their limitations, so that the various methods will be employed properly.

The main benefit of following these guidelines will be that it will result in a systematic, orderly means of selecting team members in contrast with the ways of the past. But, it must be remembered that:

There are no panaceas, and can be no panaceas, in the business of choosing people. Even when selection is practiced as rationally as possible, it is an inexact and somewhat frustrating art. The manager who expects too much from it will inevitably be disillusioned or defrauded, or both. The best that can be said for personnel selection is that, when it is handled intelligently, the results will probably be a significant improvement over the chaos and confusion which are the almost certain aftermath of unintelligent selection.⁷⁹

Fielding a Should Cost team must be the explicit responsibility of the team leader. Unless the leader personally selects the team members, a great deal of the authority and leadership inherent in his assignment is lost.

1. The very first step in staffing a Should Cost team is to determine the team size and skill mix desired. This may be difficult, but some idea is necessary. Factors that should be considered include proposed dollar value of the contract, unit price of the end item (as an indicator of complexity), amount of manufacturing required, amount of engineering and technical support required, amount to be subcontracted, proposed

⁷⁹Gellerman, op. cit., pp. 59 & 60.

length of the in-plant analysis, size of the contractor's operation, and contractor's mix of Government and commercial work. Some consideration should also be allowed for the possibility of still having selected one or two marginal employees to serve on the team.

An APRO study on team size and structure also noted that the size and mix of a team must be tailored to the magnitude and complexity of the problem. It concluded that the "advance team" best allows this condition to be met. The underlying rationale is that an advance or "scout" team, consisting of the team chief, deputy team chief, operations officer, administrative officer and sub-team chiefs, having physically reviewed the contractor's operation and been briefed by contractor management personnel and cognizant Government contract administration personnel, is able to logically identify areas for investigation that offer the most payoff potential, develop a study plan including milestones, and establish resource requirements, i.e., team size and skill mix.⁸⁰

2. A general definition of the jobs that are to be performed and the skills required is necessary. Defining the job is a prerequisite to personnel selection that should not be taken lightly. If one does not know what skills he requires, how can he effectively select personnel? Conversely, establishing too rigid a set of qualifications, which few applicants can meet, will result in a "dream sheet."

⁸⁰ For a detailed discussion of the advance team concept, see The Should Cost Team: Size and Composition by Gunther Lange, US Army Procurement Research Office, Fort Lee, Va., February 1971.

Some general guidance on skills required is in order here. In all cases, we are looking for demonstrated performance in technical skills, human skills, and conceptual skills.⁸¹ Technical skills implies an understanding of, and proficiency in, a specific kind of activity, particularly one involving methods, processes, procedures, or techniques. It involves specialized knowledge, analytical ability within that specialty, and facility in the use of the tools and techniques of the specific discipline.

Human skill is the ability to work effectively as a group member. For the team chief, deputy team chief, and sub-team chiefs, it includes the ability to build cooperative effort within the team or sub-team. It is primarily concerned with working with people. Human skill includes the ability to communicate effectively.

Conceptual skill is the ability to see the operation as a whole, recognizing how the various functions on the team work together, and how changes in one area of the team's study may affect the balance of the team's effort. It represents the coordination and integration of all the activities and interests and abilities of the team towards a common objective.

Technical skill and human skill are important at the working level, while conceptual skill becomes more important as one proceeds up the supervisory ladder.

⁸¹ Robert L. Katz, "Skills of an Effective Administrator," Harvard Business Review, XXXIII (January-February, 1955), pp. 9-18.

Underlying all these skills is motivation, drive, desire, ambition or whatever we wish to call it.

The principal criterion of skillfulness is effective action under various conditions; in other words, demonstrated job performance. This is stressed in preference to selecting personnel on the basis of their possession of a number of behavioral characteristics or personality traits. An inherent difficulty in establishing characteristics and tangible factors for the selection of Should Cost personnel is the heterogenous nature of the make-up of the team. Should Cost teams include both military and civilians, personnel from within and outside of the activity conducting the Should Cost analysis, technical (engineers, price analysts, etc.) and non-technical (management analysts, procurement analysts, etc.) personnel, and supervisory and non-supervisory personnel. Additionally, the engineers may represent various disciplines, and some may be production-oriented while others may be design-oriented.

Specific skills for the various specialties normally found on a Should Cost team are listed in Table VIII. These skills are identified as being "musts," "highly desirable" or "optional." Additionally, the following comments expand upon Table VIII:

a. Team Chief/Deputy Team Chief

It is preferred that one should have broad engineering experience and the other should have broad procurement experience. Additionally the latter should also have proven ability as a contract

Table VIII
QUALIFICATIONS FOR PERSONNEL ON SHOULD COST TEAMS

M = Minimum or "Must" qualifications
D = Highly Desirable qualifications
O = Optional qualifications
*Either Team Chief or Deputy Chief should possess the experience indicated, and together, they should possess experience in each of these areas.
**Operations Officer should have experience in one of two areas indicated.

	Technical Skill					Human Skill					Conceptual Skill					Motivation					Functional Engineering Specialist					Procurement					Price Analysis					Contract Negotiator					Second-Level Supervisor or higher					First-Time Supervisor or higher					Previous Supervision					Product knowledge					Relevant Industrial Experience					Spec. College degree					Bachelor's degree					MBA					Ability to constructively					Good writing ability					Physically fit																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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*See page 108 for comments regarding the weighting of education versus experience.

negotiator. Preferably, each one's experience should complement rather than supplement the other's, to provide broader coverage of the functional specialties present on the team.

On teams with fifteen or more people, the team chief should be at least a second-level supervisor; on smaller teams, he should be at least a first-line supervisor. The deputy team chief should be at least a first-line supervisor.

If the team does not require a deputy team chief, then the engineering experience desired should be forsaken in favor of a combination of procurement experience and proven negotiation ability.

Previous Should Cost participation is a necessity for both the team chief and the deputy team chief.

b. Operations Officer

Where there is no provision for a deputy team chief, the operations officer should possess the experience in a functional specialty that would normally have been desired of the deputy team chief.

On smaller-size teams, the operations officer may also be assigned the functions of the administrative officer, and accordingly, should be able to perform as such.

c. Engineering Sub-team Chief

This position is best filled by a supervisory industrial engineer or supervisory general engineer with experience in the specific areas cited below for industrial engineers. Additionally, he should have had previous Should Cost participation.

d. Audit/Pricing Sub-team Chief

This position is filled by an auditor designated by the Defense Contract Audit Agency (DCAA).⁸²

e. Management Sub-team Chief

This position should be filled by an individual with interdisciplinary experience, especially on a large team. On smaller teams (less than fifteen people), this position may be filled by a management analyst, procurement analyst, or industrial engineer.

Previous supervisory experience need not be a prerequisite, as this sub-team is usually very small (normally two-to-four people, including the sub-team chief).

An MBA degree for the sub-team chief would be highly desirable; a bachelor's degree in industrial engineering or business administration should be the minimum.

Experience in serving on management review teams and previous Should Cost analysis experience would both be useful.

f. All sub-team chiefs must be able to translate their group's findings into reportable form and to effectively defend them in negotiations.

g. Administrative Officer

Of all the positions on a Should Cost team, this one requires the least specific special skills or experience. In the past, Lieutenants, usually with a business degree, have served well. Especially valuable

⁸² Memorandum of Understanding, U.S. Army Materiel Command - Defense Contract Audit Agency, 1 March 1971.

can be a Lieutenant with an undergraduate degree in business or engineering and an MBA degree. This is because such a position is normally not full-time and the incumbent can also be used as a management analyst or on one of the other sub-teams.

On a small team, if a secretary is included on the team and is adept at administrative tasks, she may also function as the Administrative Officer. Another option, on small teams, is for the Operations Officer to serve as Administrative Officer.

h. Industrial Engineers

Their composite background should include experience in labor factors, manufacturing processes, production cost estimating, work standards, work measurement, plant layout, methods engineering, material handling, etc., and knowledge of sampling theory, probability theory, confidence levels and learning curves. A bachelor's degree in engineering should be a "must." At least one of the Industrial Engineers should have above average writing ability.

i. General Engineers (also Mechanical, Electronic, Aerospace, Chemical, Automotive, etc.)

Experience is desired in manufacturing processes typical of those used by the contractor being analyzed. Also desirable is experience in production cost estimating. Having at least one engineer with a high degree of technical familiarity with the product to be manufactured can also be beneficial. While there is the risk of such an individual being

overly defensive of the status-quo, normally this is outweighed by his ability to resolve questions of a technical nature raised by other team members during the analysis.

A bachelor's degree in engineering is a "must." For this group too, at least one of the engineers should be above average in writing ability.

The Army Materiel Command conducts a two-year Engineering Intern Training Program at Red River Army Depot, Texarkana, Texas in conjunction with Texas A&M University. Interns specialize in maintainability engineering, production design engineering or safety engineering. The first class in maintainability engineering graduated in 1968 and the first classes in the other programs graduated in 1971. Most interns concurrently earn a master's degree in industrial engineering.

Upon completion of the training program, the graduates are normally assigned as GS-11, General Engineers, to the commodity commands. It appears that those graduates of the program who specialized in production design engineering and/or possess an undergraduate degree in industrial engineering should merit special consideration for participation on Should Cost teams. Consequently, efforts are underway to identify these graduates and furnish their resumes to the Should Cost Coordinator at Hqs., AMC.

j. Industrial Specialists/Product Assurance Specialists

Normally, provision should be made for having an industrial specialist or product assurance specialist on the team, if such an individual has had extremely relevant experience of an intensive nature with a

particular product line or manufacturing process. This person may serve as the "technical expert" for the product being studied, but again, his potential lack of objectivity must merit close observation.

k. Auditors

Auditors are furnished by DCAA.

l. Price Analysts

Preferred are those price analysts with industrial experience in cost estimating or cost accounting, or an audit background. Where possible, the price analysts should have had previous on-site experience with contractors' accounting systems, for they will be more likely to know the types of cost data which contractors normally have available and know how to ask for it.

Since price analysts may be integrating the auditor's findings with the engineers' findings, good writing ability is a necessity.

A college degree in accounting is desirable, but should not be a prerequisite, since the supply of available price analysts is very limited to begin with.

m. Procurement Analysts/Contract Specialists, Management Analysts

Normally, procurement analysts/contract specialists can best be used to review a contractor's management practices, make-or-buy policies, purchasing system, etc. They can be used as management analysts, if such talent, per se, is not available. Although the supply of college graduates in these fields is limited, personnel should have had some college courses

in business administration. Relying strictly on their work experience as a basis for selection may provide too narrow a base for broad, in-depth analysis.

n. The use of engineering technicians and engineering aides during the in-plant phase, to extract data for analysis by other members of the team, has been recommended by past team leaders as a better way of utilizing available talent, rather than having engineers and auditors performing basic data-gathering tasks. For example, industrial engineering technicians (GS-802 series) can perform time studies, thereby freeing industrial engineers (GS-896 series) for other tasks.

o. The problem of lack of adequate writing ability, especially among engineers, has plagued most Should Cost teams. The inability of team members to effectively support their position in writing in a logical, concise manner becomes a serious handicap to the negotiator. Numerous team leaders have stressed the need for a writer-editor to be available at or near the end of the in-plant analysis to assist in the report writing.

p. Where there are to be several persons on the team with a particular functional specialty, such as industrial engineering or price analysis, consideration should be given to selecting personnel with heterogeneous experience, to provide a broader capability for analysis. Evaluation of a proposal in depth requires the availability of all the disciplines that were used in its development. Depending on study requirements, personnel with work skills in the areas of software analysis, computer equipment analysis, test and reliability, and property administration, should be considered for part-time or full-time team membership.

3. One of the major reasons for haphazard selection procedures is the lack of time normally allowed for the selection process. Selection of team members should start far enough in advance of the study to allow for screening and interviews of prospective team members. Some team chiefs have thought that up to six weeks is necessary to complete the selection process. On the other hand, the selection process should not be so drawn out that the interest of prospective team members and their willingness to participate is undermined by months of indecision on the part of the team leaders.

4. After team size and skill mix have been tentatively decided, and the job requirements analyzed, the next step is to develop a listing of prospective team members. The best source is to request, through the local Civilian Personnel Office, data printouts (AMC 1320, Career Program Referral Listing) on all persons who have served in a specific experience code (Experience Codes are listed in Department of the Army Civilian Personnel Regulation 950-14), within a specified period, either with industry or at a certain grade level, who are employed in a stated geographical area. For example, it would be possible to obtain printouts on all Civil Service employees who have served as Industrial Engineers, at the GS-12 level or higher, or with private industry, in the past ten years and who currently reside in Missouri or Illinois. It is possible to limit the printouts to employees from one command, from AMC or from the Army.

Experience codes are defined in some detail so that it is possible to identify experience within a specific commodity line. The data contained on these printouts is equivalent to the information that would normally

be found in a resume. Included in the printout is the employee's career appraisals (performance ratings) for the past three years as well as the supervisor's narrative comments that were contained on the employee's most recent appraisal; this data is taken from DD Form 1559, Employee Career Appraisal (see pages 54-56).

Another source of information is the "Should Cost Analysis Roster" maintained by Hqs., AMC. This roster also doubles as the AMC Source Selection Cost Estimating Roster and contains resumes primarily on personnel associated with the functions of price analysis, cost analysis and program cost estimating. This roster is available through the Should Cost Coordinator at the Commodity Command.

Additionally, inquiries may be made of local personnel who would be knowledgeable of other prospective team members including military personnel. For these personnel, resumes should also be obtained.

In reviewing rosters and resumes, it must be remembered that they merely indicate that an individual should be able to do the job; they are no indication that he can.

5. The resumes should be screened so that only those persons who satisfy the "mandatory" qualifications listed in Table VIII are given further consideration. If there are a substantial number, a quick review of those who appear to possess more of the "highly desirable" qualifications is necessary, to reduce the number of candidates for each position to a manageable number - normally four to six.

One rule that should be adhered to strictly is to immediately drop from consideration any employee who has received a "2" or less in

any one of the seven categories contained on DD Form 1559, Employee Career Appraisal. Based on an analysis of the performance of Should Cost team members to date, following this guideline should eliminate a goodly number of the marginal performers.

To avoid wasting time in evaluating personnel who do not desire to participate in a Should Cost analysis, the next step should be to contact each individual still under consideration to ascertain his willingness to serve. Those who are adamantly opposed should be dropped from further consideration for such individuals will lack the motivation, the sense of urgency, and the interest in the overall objective of the analysis to function in a superior manner. This is also the appropriate time to inquire as to the individual's availability for the full length of the study.

6. At this point, it is appropriate to begin thinking about a means of rating the remaining prospects. It must be remembered that we are looking for demonstrated competency in the areas of technical skills, human skills and conceptual skills. The following has been suggested as criteria against which to judge one's potential:

1. What the candidate has done so far in his life - his prior accomplishments at work, in school, with his family, and in his extra-curricular activities.
2. His knowledge - his education, training, experience, self-assimilated knowledge, as an indication of what he can do.
3. His capacity to learn and grow - his intelligence and aptitudes.
4. His motives and drives, his interests, his physical and mental health and stamina as indicators of what he will do.

Fortunately, the key elements of these criteria are readily observable and subject to evaluation; previous performance and knowledge. Capacity and the "will do" factors are crucial, to be

sure, but usually they have in large measure already manifested themselves in the man's accomplishments and attained knowledge. So the major emphasis should be on a complete and reliable evaluation of the candidate's background.⁸³

One of the ways to formalize the selection process is to quantify the various factors which one considers most important in identifying the potential of candidates. In some respects, the construction of such a rating scale conforms to the approach used by industry in establishing "merit ratings" for salary purposes.

In a very simplified manner, one may proceed by listing the skills or factors that he considers important, assign relative weights to each factor and then assign a point score for each factor. The sum of the products obtained by multiplying the relative weights times the raw scores would represent the individual's rating. For example, in looking at industrial engineers, either of the following evaluation criteria might be used:

<u>Skill</u>	<u>Weight</u>	<u>Raw Score</u> <u>(1-10)</u>	<u>Weighted Score</u> <u>(Weight X Score)</u>
Technical Skill	— %		
Human Skill	— %		
Conceptual Skill	— %		
Motivation	— %		
Writing Ability	— %		
	100%		Rating =

For those who prefer to think in terms of more common attributes, the following factors might be considered:

⁸³ John R. Hinrichs, High-Talent Personnel (New York: American Management Association, 1966), p. 93.

<u>Factor</u>	<u>Weight</u>	<u>Raw Score</u> <u>(1-10)</u>	<u>Weighted Score</u> <u>(Weight X Score)</u>
Education	___%		
Government Experience	___%		
Industrial Experience	___%		
Performance Appraisal and Supervisor's Comments	___%		
Personal Characteristics (motivation, stamina, person- ality, communicative ability, etc.)	___%		
Writing Ability	___%		
	100%	Rating =	

The weightings assigned need not be the same for different functional specialties. for a price analyst, it might be desirable to emphasize technical skill less and human skill more, or to emphasize industrial experience less and writing ability more.

While it is recognized that the rating approaches suggested above lack any proof as to their validity and reliability in the selection of Should Cost analysts, they are offered as an attempt to quantify what, to date, have been strictly qualitative determinations. In this respect, it is a sizeable improvement over the past, since it requires a more systematic procedure to accomplish the evaluation.

7. The evaluation necessary to form a basis for the ratings should rely on information obtained from several sources. Utilizing several inputs to obtain the information serves as a safeguard to insure that, to the extent practicable, the information obtained is correct and complete. The primary sources of information available are:

- a. the resume (e.g., AMC Form 1320, for biographical information such as education and experience),
- b. performance appraisals (DD Form 1559, summarized on AMC Form 1320),
- c. inquiry of supervisors and others, and
- d. the interview.

That the information to be gathered from these sources is relatively easy to obtain does not mean that it can be used indiscriminately; accordingly, in the discussion which follows regarding this information, appropriate guidance is provided regarding its proper use.

The ineffectiveness of a selection process can often be attributed to reliance on information which is not an accurate indication of job performance. In conjunction with this, there is the problem of "selective perception," the natural human characteristic which tends to place too much emphasis on first impressions; this is often caused by a bias on the part of the selector.

Similarly, there is the tendency on the part of many people to either overvalue education and undervalue experience or vice-versa; it is difficult, if not impossible, to state precisely what the balance should be between the two. For technical positions, especially in the engineering field, a bachelor's degree should normally be a "must" because it signifies an overall grasp of technical knowledge and diminishes the possibility of "tunnel vision," although an individual who has completed a course of study at a recognized trade school or participated in a strong apprenticeship program, coupled with good work experience, may be desirable for reviewing areas requiring special expertise. Likewise there will be cases where a

person having actual production and shop experience including selection of production equipment and experience in processing and estimating from drawings, can benefit the Should Cost team. Also, one's competence may be evidenced by certification as a Professional Engineer. In any functional specialty, prior industrial experience must be considered in light of what the individual got from it. To some, five years of experience may really be one year repeated five times. Likewise of importance is the reason for one leaving private industry to work for the Government - those who appear to be "burned-out" must be avoided. The answers to these questions regarding the value of education and experience are best answered by demonstrated job performance, but must often be discussed during the interview and in inquiries of the employee's supervisor and other persons knowledgeable of the individual's job performance and abilities. When training and experience are evaluated solely on the basis of a few statements in a resume, it completely omits the qualitative aspects of the evaluation. Placing minimum requirements on experience either by specifying a certain number of years in industrial experience or by specifying a certain number of years at a certain grade level may have an adverse affect of tossing aside the enthusiastic and educated young employee who can perform admirably. If one is too particular in specifying experience requirements by emphasizing the quantity aspects, e.g., X years of experience, and not the qualitative aspects, the selection situation may be loaded to produce no better than the best of a poor lot.

Employee career appraisal information contained on AMC Form 1320 should be taken lightly. A review of these appraisal ratings discloses

strong evidence of the "leniency error" - the awarding of a higher evaluation in one or more traits than the employee actually deserves. This "leniency error" is so pronounced that, while the maximum rating a civilian working for the Army can obtain is 4.0 in each of seven categories, the average for all seven categories for employees in the functional specialties common to Should Cost teams tends to be between 3.6 and 3.8. And, at one commodity command, all 85 persons with current procurement and pricing experience, GS-12 and above, received the highest rating (4.0) in each category. As stated earlier, the only definite advice that can be given regarding reliance upon employee career appraisals is to avoid prospects who have received a "2" or less in any of the seven categories in their most recent appraisal. Those appraisals that are favorable can only be considered as a very, very rough indicator, for the ability of the current career appraisal system to provide distinctions between "relatively successful" and "relatively unsuccessful" employees is highly suspect.

How should any significant value be attached to the supervisor's narrative comments contained on AMC Form 1320. On the other hand, an employee who has received an outstanding performance award, sustained superior performance award or quality step increase in the past several years is, in all likelihood, a very capable prospect; however, lack of such an award cannot be considered to indicate a lesser degree of capability.

Persons to be contacted should normally include the employee's supervisor plus others who are familiar with the employee's performance. While these inquiries can be very enlightening, be aware that the qualitative data generated represents opinions by persons whose attitudes and biases are unknown. To avoid relying on the possibly erroneous judgment

of one person, inquiries should be made of others familiar with the individual under consideration, if practicable. Preferably, there should be a structured format to the inquiry, so that all major aspects of all the prospects' performances are covered in a consistent manner. When inquiry is made of the supervisor, the employee's availability for a Should Cost study should be discussed.

One rule of thumb, although not validated, is that if the supervisor stresses the employee's unavailability for a Should Cost assignment, because of high priority tasks in his regular assignment, the odds are that the individual is highly competent and, if he is at the top of our rating scheme, every effort should be made to obtain him. If the supervisor has no qualms about loaning the employee, the opposite may be true.

Some people suggest that a better source of information than the employee's current supervisor is his last previous supervisor; this reasoning assumes that the supervisor will be more honest in his evaluation now that the employee does not work for him, and that the likelihood of the "leniency error" coming into play is diminished. At the same time, one must be aware that some supervisors feel that anyone who leaves them is ipso facto disloyal and they make a practice of criticizing former subordinates.

Most persons in a position to hire, feel that the interview is the mainstay of the selection process; however, the value of the interview is strongly questioned by industrial psychologists as to its validity and reliability. If the interview is employed, it should be in person rather than over the telephone, and a structured interview, that is, one that

follows a prescribed format, is highly favored over an unstructured interview. One of the chief problems occasioned by the interview is "selective perception," the natural human characteristic which tends to place too much emphasis on first impressions, reflecting a bias on the part of the interviewer.

The key points that can be offered about the interview are that, in the best selection programs the interview will be only one of a number of selection methods used, that structured interviews tend to have greater reliability than unstructured (informal) ones, that combining the evaluations of several interviewers on a single applicant may serve to reduce the bias of any one interviewer, that allowing knowledgeable journeymen to serve as interviewers may result in a better evaluation of technical skills and knowledge and that interviewing several applicants for the same position, on a group basis, may provide valuable insight into leadership traits and problem-solving abilities.

Although most of the "how-to-interview" articles are not based on research-validated data, the following is a listing of the major points observed by experienced interviewers in conducting their interviews, and is presented for the benefit of the novice interviewer so he will be able to conduct the interview as "a business conversation with a purpose, not as an aimless discussion."

How does the experienced interviewer conduct his interview?

1. He has a plan. He knows in advance the kinds of information to be obtained in the interview. [Advance planning is essential to establish effective rapport and avoid repetition and meandering.]

2. He has adequate job knowledge. He is thoroughly familiar with the specifications of the job for which the applicant is applying. He is prepared to relate the job requirements to those qualifications of the applicant that can be judged in the interview. He remembers that one objective of the interview is to give job and company information.
3. He has adequate background information on the applicant. Prior to the interview the interviewer reviews the application blank, reference checks, preliminary interviewer's notes, and test scores. He does not waste interview time by asking for information already available.
4. He schedules interviews so that he has enough time. . . He gives the interviewee time to formulate his replies or to recall experiences so full information may be gathered.
5. He insures that interviews are held in private.
6. He puts the applicant at ease.
7. He lets the applicant talk. He recognizes that the interview has been scheduled in order to obtain information about the applicant.
8. He avoids leading questions.
9. He adjusts the level of his language to the ability of the respondent.
10. He keeps control of the interview.
11. He is aware of his own prejudices and tries to avoid their influence on his judgments. He is particularly conscious of the dangers of allowing specific physical or cultural stereotypes to mask his accurate appraisal of the interviewee. He is careful to discount initial impressions whether favorable or unfavorable when evaluating specific traits. He avoids generalizing from one trait to other traits.
12. He avoids any suggestion of discrimination.

13. He knows how and when to close the interview.
14. He records the facts during the interview and impressions and judgments immediately thereafter.⁸⁴

In preparing for the employment interview, Mandell states that

The information on the application blank should always be thoroughly reviewed before the interview. In this review, consideration should be given to:

1. The accuracy and reliability of the information. For example, the date of birth is checked against age, age against date of leaving school, date of leaving school against number of years attended, and the date of first employment. Breaks or overlaps of employment should also be checked.
2. Number of positions and length of time held as an indication of stability. This factor must always be evaluated in terms of the applicant's reasons for leaving former positions.
3. Nature of experience in terms of the duties performed as related to the duties involved in the position for which he is being considered.
4. The progression of past employment, which may indicate whether the applicant is on the upgrade. Have his responsibilities increased, decreased, or remained constant?
5. Unexplained breaks in the service record which might indicate discharge or other information which the employee might wish to conceal.
6. Educational background.
7. Special schooling, hobbies, or awards, which might indicate likes and dislikes. . . .

⁸⁴ C. Harold Stone and William E. Kendall, Effective Personnel Selection Procedures (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1956), pp. 223-225.

For selection purposes we should have evidence not only that the possession of an ability exists in the applicant, but that he demonstrates his interest in using it.⁸⁵

8. Now that sufficient information has been obtained regarding the prospect's abilities and accomplishments, the formal rating should be accomplished and the individuals who rank the highest should be secured for the team. If problems result in obtaining a supervisor's release of the employee, assistance should be sought from the Should Cost Coordinator, and the Director of Procurement and Production, if necessary. If the best qualified personnel will not be available, then the procedure that has just been outlined is of questionable value, since availability and not qualifications will unfortunately be the primary concern.

Those employees who were in consideration but not selected should be so notified. Their names and ratings should not be discarded, though, since there is always the possibility that replacements might be required during the course of the analysis.

9. The value of holding a training session, such as the Should Cost Workshop, immediately prior to the in-plant analysis, deserves considerable consideration since it possesses some of the qualities of a skills test while at the same time serves as a means of observing the performance of prospective team members in a form of situational test. Such a training session can provide the team leader with an excellent opportunity to

⁸⁵ Milton M. Mandell, quoting from a Sandia Corporation publication in The Selection Process: Choosing the Right Man for the Job (New York: American Management Association, 1964), pp. 206-207.

evaluate the potential performance of team members. The only difficulty here is that it might be wise to actually have more personnel in the training session than will be required to perform the analysis so that if individuals are to be rejected on the basis of their performance during the training session, there will be trained alternates available.

If the training session is to contain more people than will be on the team, it would be best to not even decide who will actually be on the team until after the Workshop is completed. In this way, those who desire to serve on the team will be motivated to perform best during the Workshop and, hopefully, their performance will attract the attention of the team leaders. The training session may also provide the opportunity to evaluate a prospect's writing ability, which, under current conditions, is usually only found out during the report-writing phase, when it is often too late to take corrective action. Good writing ability can reduce considerably the trials and tribulations inherent in the report-writing phase.

Even if the training session is limited only to those who have been selected to serve on the team, the training session still provides the opportunity to observe the individual's strengths and weaknesses, which can be very useful in making team assignments.

10. After selecting team members, keep them informed of the status of the study and strive for good communications during the course of the study. This helps in developing their confidence and initiating their self-starting capability and motivation.

11. As a final caution so that the decision maker will not be frustrated by some failures in the selection process, even where a

systematic, logical approach is followed, the following quote, while rather dramatic, provides some food for thought.

. . . people who are uncomfortable about working with imperfect [selection] instruments, and who would be disturbed by knowing that their most sincere efforts will inevitably turn up a certain percentage of the time as mistakes, do not belong in the selection business.⁸⁶

C. Recommendations

While the main objective of this report is to develop guidance for the identification and selection of personnel to perform Should Cost analyses, there are two areas which require attention to facilitate the selection process; one is the establishment of a roster of "top-performers" and the other is a conscious effort to uphold the image of Should Cost.

AMC Regulation 715-92, "Should Cost Analysis" provides for the Source Selection Cost Estimating Roster (AMCR 715-90) to also be used as the "Should Cost Analysis Roster." The regulation states that "Highly qualified and motivated personnel must be identified as potential members of Should Cost Analysis teams" and consequently included on the roster, and that "Personnel selected for the Should Cost Analysis Roster must have mobility to the extent required to perform a Should Cost Analysis study."

There is no way to assure that personnel nominated for the roster are "highly qualified and motivated" and there is an "easy way out" for qualified personnel to eliminate themselves from consideration by professing to lack mobility. In several instances, it has appeared that nearly all personnel in a pricing branch or cost and economic systems group have been placed on the roster without discriminating as to their abilities.

⁸⁶Gellerman, op. cit., p. 95. .

The trouble with such a roster is that it identifies individuals who should be able to do the job, but gives no assurance whatsoever that they can. Essentially, it is a list of unknown quantities.

Accordingly, it is recommended that AMC develop a roster of personnel considered to be above average in their respective fields. Industrial firms do this in their merit rating programs, and consequently can readily identify those employees in the top quartile.⁸⁷

An example of how this might work would be for each command to submit separately, for grades GS-11, 12 and 13, and for procurement personnel, price analysts, and the non-R&D engineering specialties, a list of those personnel within each functional specialty and grade who are considered to be:

1. in the top 25 percent, where the population consists of fifty people or less;
2. in the top 20 percent, where there are 51 to 100 persons in the group;
3. in the top 15 percent, where there are 101 to 200 persons in the group;
4. in the top 10 percent, where there are over 200 persons in the group.

⁸⁷The difficulty within the Government of developing a roster which contains only the "best qualified" employees is currently being experienced within AMC. To identify the "best qualified negotiators to contract for major and/or important procurements," Hq AMC established and furnished criteria to the commodity commands for their designation of high quality negotiators at various grade levels. Hq AMC screened each nominee to insure that quality standards were maintained. As a result of their review, from one-fourth to one-half of each command's nominations were deemed not to be "best qualified." Only 57 percent of all the commands' nominations were classified by Hq AMC as "best qualified." [IMPACT Report, Improved Management of Procurement and Contracting Techniques, (Washington: Headquarters, U.S. Army Materiel Command, February, 1972) pp. 20-21.]

Such a roster would best be established by a request from the Commanding General, U.S. Army Materiel Command to the Commanding General of each commodity command. The request should identify the functional specialties from which the people are to be nominated and the grades to be considered. The grades within a functional specialty should not be grouped together; to do so could result in "fast risers" in a lower grade being overshadowed by an abundance of old-timers in a higher grade.

The roster could be described as a "Special Projects Roster" for the purpose of identifying exceptionally well-qualified talent within the commands. No exclusion of eligible individuals should be allowed because of nonavailability. The question of availability should not be raised until an individual is being considered for a specific project; otherwise, well-qualified personnel may, as a matter of convenience, either on their part or their supervisor's, attempt to become exempt beforehand. Input from the commands need list only the names and social security numbers for each functional specialty and grade, as AMC Form 1320, Career Program Referral Listing can be obtained, avoiding the preparation of special resumes as is currently done. The roster should be maintained on an annual basis.

The roster should not be viewed as an alternate selection methodology, rather, it should be considered a supplement. It is still necessary to insure that the skills of personnel listed on the roster match the skills required for the Should Cost analysis. Specifically, a "Special Projects Roster" would be of great benefit in developing the listing of persons to

be considered for the team, especially where time is of the essence. Since demonstrated job performance will be the basis for persons being named to the "Special Projects Roster," the evaluation and rating of these persons could easily be expedited. Also, such a roster should increase the likelihood of selecting capable, highly-qualified persons.

The existence of such a roster, identifying only the superior performers, could be a significant asset in identifying and selecting personnel for, not only Should Cost analyses, but for other special projects throughout AMC as well. While this might mean that the burden of participation in special assignments could fall upon a relatively few, why should special projects be staffed with less than "top-drawer" talent?

The second way to facilitate the selection of personnel to serve on Should Cost teams is to be concerned with the image of Should Cost. A statement by Gellerman, while written in an industrial context, points out well the need for a good image:

. . . when the talent being sought is relatively scarce, the candidates may do more selecting of employers than the employers do of candidates. Before the selectors can even begin their work, the candidates must first decide whether they want to become candidates for the firm that is doing the hiring. The effect of this "selection of employers" by job seekers is largely negative, and therefore its effects are largely hidden. When potential employees decide, for whatever reason, not to apply to a particular company for employment, that company's pool of candidates is that much more restricted and the task of its selectors is that much more difficult.

This happens all the time, much to the detriment of the firms it affects and sometimes to the detriment of the candidates themselves. It happens because of various myths, scraps of information, half-truths, and full truths which combine to form all that an outsider knows about a company which indicate to him that he

probably wouldn't like it there. In recent years it has become popular to refer to this collection of popular, if not entirely accurate, ideas about a company as its "image." An effective selection strategy necessarily starts here, in a consideration of how to maximize the attractiveness of a firm to the kinds of people it needs to hire. However, there is a good deal of fiction in most company images, and for this reason executives sometimes tend to dismiss them as untrue and therefore insignificant. This is a mistake. Like it or not, the flow of talent into or away from any organization is regulated by the opinions of people who are usually ill informed about what the organization is really like and quite indifferent to whether their impressions are reliable: the potential candidates themselves. If the best men available choose to make themselves unavailable to a particular company, that company is in trouble, and no amount of expertise in selection can save it.⁸⁸

To prevent damage to the image of Should Cost, two things must be done. First, the commodity commands must accept it as an effective analysis technique and be willing to apply Should Cost wherever it appears cost effective. Second, there is a need for a uniform policy on the treatment of team members and for quick response in the approval of Should Cost analyses and the appointment of team leaders.

⁸⁸Saul W. Gellerman, Management by Motivation (New York: American Management Association, 1968), pp. 88 & 89.

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APPENDIX

QUESTIONNAIRE FOR SHOULD COST TEAM LEADERS

1. How were team members selected?

By whom?

Interview?

Personal (face-to-face)?

Telephone?

2. If you were the selector, what qualifications were you looking for?

Minimum -

Desirable -

Optional -

3. Did you interview more than one individual for each job, or did you tend to use a "go/no go" criterion in selecting individuals, i.e., only when the first individual was not deemed satisfactory was another individual interviewed for the same position?

4. Were there any individuals whom you did not select after interviewing because their qualifications did not make them suitable for the Should Cost team?

5. Do you feel the selection process was adequate as evidenced by the actual performance of the team members?

6. Were any team members sent home because of marginal or sub-marginal performance?

Were there any you should have sent home but "hung on" with?

7. Based on hindsight, what do you now feel are the most important traits, qualifications, characteristics, etc. of prospective team members?

and/or

If you were to head up another Should Cost team, what qualifications would you look for that you did not give much consideration to before?

What qualifications that you were concerned with before would you now place less emphasis on?

8. Do you have any specific suggestions for improving the selection process of Should Cost team members?